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PC PILOT

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Airport 2000 Vol.3 could be the best yet

THE PROPHET'S ON SONG

Pretty pictures from the Hercules 4500

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Don't Fly! until you see the whites of their fivers!

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Flight simulators - help or hindrance in learning to fly?

DECIDE, ROTATE, CLIMBOUT!

How to fly an airliner the right way

PLUS ALL THIS INSIDE:

WarBirds III • Falcon V • PBY Catalina • FS Navigator • Airline Pilot 1 • German Airports 1 • Lock On • X-Plane • Televiewer • and more...

SEPT/OCT 2001 № 12 : GBP £4.99

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THE X-PLANE GUIDE TO: AERO DYNAMICS

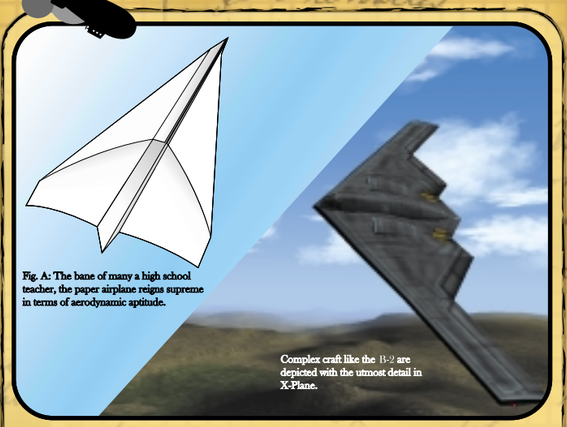
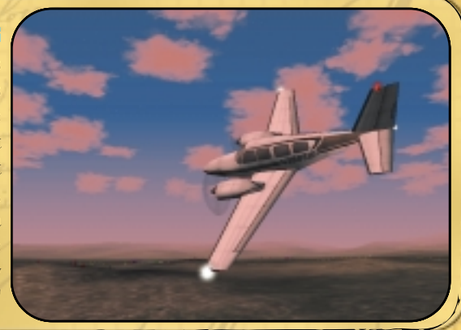


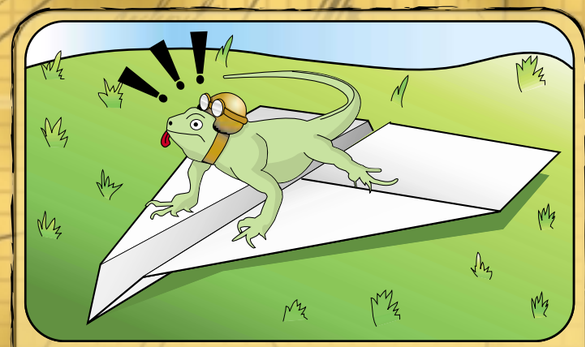
Fig. A: The bane of many a high school teacher, the paper airplane reigns supreme in terms of aerodynamic aptitude.

Complex craft like the B-2 are depicted with the utmost detail in X-Plane.

SIMPLE AERODYNAMICS are best explained through the use of such classic objects as the paper airplane (fig. A). Even in today's high tech flight sim market, only X-Plane can accurately depict this marvel of physics.

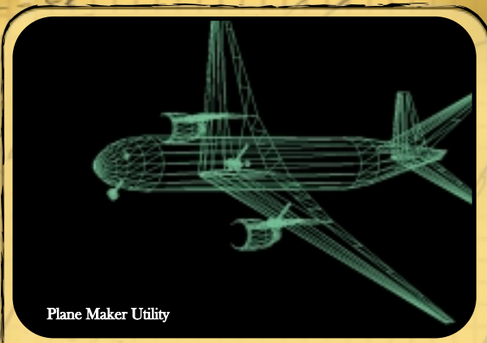
X-PLANE'S flawless aerodynamics model is the perfect constant to test the theory, "Can I launch a paper airplane 500 ft. from my office window."





ONCE CONSTRUCTED, you must outfit your test craft with a pilot. While plastic army men are more suited to an aerial environment, a small garden lizard can be an excellent test pilot for your maiden voyage.

NOTE THAT WHILE sophisticated in it's own right, the lizard's natural interface is far surpassed by that of X-Plane, which sports ultra-realistic navigation and instrumentation.



Plane Maker Utility

PROPER FLIGHT procedure requires preflight training, and X-Plane offers just the tools you'll need. Simply recreate your paper masterpiece using X-Plane's exclusive Plane Maker and test it out using actual scenery with real-time weather updates.

NEXT LESSON: How to manipulate the aerodynamic structure of your other flight sim CD's. X-Plane. The most advanced PC flight sim ever.

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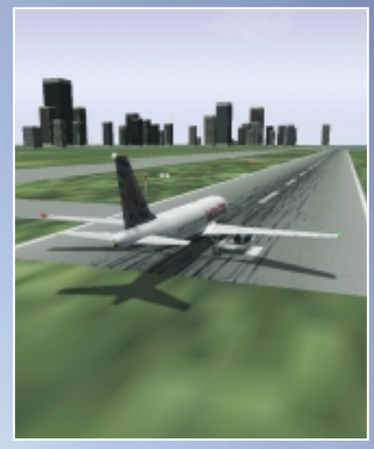

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PC PILOT

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SUBMISSIONS

We will gladly accept and review for publication any letters, articles, photographs or other contributions. We cannot guarantee publication nor, regrettably, return items sent to us or be responsible for their loss. We will try and reply where possible. Any letters are assumed suitable for publication unless we are otherwise notified.

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COMMS

FROM: "John"

As a true flight simmer I find the last few issues of PC Pilot seem to be leaning towards combat aircraft as every other page features these planes. How can you pride yourself that "flightsim is a hobby not a game" when combat sims are about winning and losing, just like a game? if this is the direction you intend to go then perhaps you should rename your magazine Combat Pilot. What do other flight simmers out there think?

We reply:

It's always difficult to get the balance right and we accept that someone will always feel we've got it wrong, but it's hard to argue that a product like Eurofighter Typhoon is only a game, when the same team that test the real aircraft helped develop the sim. We like to think that to a certain extent PC Pilot will appeal to aviation enthusiasts who happen to have a PC and therefore we reflect aviation as it is, with combat aircraft playing an important part. Excluding features like Comms, the CD and News, Issue 11 had 16 pages devoted to 'Combat' and Issue 10 had about 11 pages. We get a fair amount of mail from combat fans saying that we feature far too many 'target aircraft', so over to you, the readers – too much combat or not enough? Oh, and while you're at it, can anyone tell us which is better, Rock & Roll or Jazz and do pizzas taste nicer than Bolognese?

FROM: Don Rowley

Many thanks for your excellent Tutorials. Unfortunately, owing to other commitments, I have only just managed to complete the Issue 10 IFR Back Course Tutorial, which I really enjoyed and found particularly challenging. However, I am intrigued by your procedure for entering the holding pattern.

Flying to the anchor point and proceeding outbound along the inbound leg at the same altitude as inbound aircraft strikes me as being as exciting as joining the M25 motorway by heading south along the north-bound carriageway to the next junction before rejoining the north-bound carriageway heading north!

Did I mis-read your instructions or if this is what happens in real life aviation how is a collision avoidance managed?

Bill Stack replies:

Our IFR tutorials use controlled airports. Nothing would be done at these airports in real-world flying without ATC clearance. Whenever ATC cannot maintain adequate separation in the approaches, it assigns aircraft to holding patterns at specific altitudes until separation can be maintained. Strict adherence to all clearances, altitudes and prescribed procedures is necessary for safety and is therefore required by ATC. Hope this helps to clarify things.

FROM: Steve Wiliamson

As you can imagine it's hard these days to go to a shop and try to get some help and advice as they just want to sell you a product and they don't always know the true details of pitfalls in the products or the consequences of a mixture of different items and what can actually happen in that same mixture.

I am trying to get to the best solution to my current problem of computer lock-ups and having to re-set every now and then. My system is rather old and I intend to do a major up-grade shortly which is where you come in. I would like to have a 1.3Mhz processor and a 1.3 board as well as a 64Mb 3D graphics card and a SoundBlaster card such as the live or equivalent with a 40Gig 7,500rpm H/Drive. I don't really know the sort of reliable makes I should go for. I am also stuck for the best and most stable operating system as well. Should I have Win98se or Win2000 Pro. I use my PC for personal entertainment only, not work, and am an avid flight-sim pilot.I will use the system for FS98 as it's still a favourite of mine and for FS2002 when it's out, for CFS1 and CFS as well and hopefully for the Falcon I and version II as well. Now that you know the sort of thing that I will be using my computer for I would really appreciate your help on this.

Greg Gott replies:

We can only give you our opinion on what may be a good choice, but taking your points one at a time:

We still give the AMD Athlon CPU's the nod over Intel. Lower cost and higher performance in 3D make it an easy choice. Beware of the power demands it makes, however, being sure to have a 300w power supply in your system. ABIT, MSI, ASUS, and EPOX are the top four brands in motherboards, in our opinion. You will want one with a VIA KT133A chipset on board to support your 1.3 or 1.4GHz CPU. Look through the respective websites for these boards.

For graphics cards there's a choice of two. With no budget worries the GeForce2 Ultra or a GeForce3 card would be our pick. ASUS, VisionTek, Gainward, and Hercules are manufacturers of great boards with these chips aboard. A good lower budget card is the Hercules Prophet 4500.

For sound cards the Guillemot Maxi Sound Muse and Turtle Beach Santa Cruz are excellent performers for much less money than Sound Blaster Live and the Live has run into many bumps along the road.

For hard drives, go for Maxtor and Seagate.

Windows 98 or ME are still the best bets for gaming compatibility and optimised drivers. Windows 2000 is great, but not for all that flying you want to do! (We use all three, FYI.) Hope this helps you out of the starting gate.

The Litigation Game

"Nice to sue you, to sue you, nice!"

Welcome to the twelfth issue of PC Pilot – it certainly doesn't seem like it's been two years since the first copy hit the streets, or rather the letterboxes. We'd like to extend a special thank you to those of you who have been with us since the first issue and also say to everyone who has peeped at a copy of our humble offering: "many thanks and keep the feedback coming!"

After nearly 24 months of publishing PC Pilot, our one serious disappointment was that we'd never received the obligatory badly constructed letter containing dubious threats of legal action, copied in to a host of third parties. However, all this changed at the end of May, when a reader, instead of writing to us about a grievance with an article or feature, a reader sent a fax to some of the retailers that sell PC Pilot (and possibly some that don't) late on Thursday 31st May, telling them to remove PC Pilot from their shelves by Monday 2nd June (albeit that our own Gregorian calendar clearly pointed to Monday falling on 4th June). Naturally, like all magazines and newspapers, we indemnify distributors and retailers against legal action arising from our content, so it certainly seemed an unusual and fruitless route to take – we have got a reader's letter page, after all! No one from any of the companies mentioned in the fax and not even the two solicitors copied in, had ever contacted us to advise that they had a problem. Even more unusual was that the fax didn't specify which issue(s), article(s) or feature(s) were at fault. Anyway, the result of all this pseudo-legal correspondence was to let us know that we've finally 'arrived' in flight simulation. We've always felt that we couldn't be taken completely seriously until we'd had one of these unusually worded letters, signed in the style of a solicitor, that are so popular amongst developers, publishers and webmasters.

Hot on the heels and apparently unrelated to the above, some correspondence arrived at our office from a solicitor, advising two individuals, who aren't connected with PC Pilot, that legal action would be taken against them by a well-known airline because they were using its name and logos for their VA. As well as the usual excuses about protecting their IP (intellectual property), there was also the suggestion that the site was being used for "cyber-squatting". In case you aren't aware, it's now illegal to register a domain name like www.pcpilotthemagazine.com and then try to get the company whose name you've used to pay you for passing it over to them. It transpired that the reason the letters came to our address was because details of a PC Pilot competition were placed on the VA website, with the address for sending entries, and this was assumed to be the address of the VA. Possibly a bit more 'due diligence' was required when reading what was on the screen. We sent the letters back and politely refused an offer of compensation for our trouble.

The Spirit of Flight Simulation?

The VA was advised to write an apology, pay a sum of money and pass their domain name to the airline or face legal action. This is not the first time that this sort of stance has been taken by an airline and frankly we think it's shameful. VAs are usually named after real airlines because the organisers of the VA are 'fans' of the company. To take action against them is tantamount to a Premier League football club or NFL team, suing their supporters for using their crest on a website, or wearing the club's shirts in public without a proper licence to display their IP. We wonder how popular Manchester United would become if they started threatening their fans for saying "I love Man United" on a website, or wearing the shirt they've just sold them without authority!

Although you could easily understand a club suing a publisher that was selling a football game containing their strip, badges and players, it is hardly the same 'theft of copyright' as a non-profit making group of enthusiasts flying aircraft painted in the company colours on the Internet. We'd like to wish 'The Accused' the best of luck and hope that the airline sees sense. Maybe a letter to the MD explaining how ludicrous the situation appears might be an idea and if that doesn't work, there's always the tabloid press!

This is quite a way from the thin end of the wedge, in fact that wedge is getting quite thick, even as we write. Roll on those add-ons filled with plain white aircraft and VAs named after the prison in which the organisers are languishing, having failed to pay damages to the real airline. Virtual San Quentin and Wandsworth VA aren't quite such appealing names!

Finally, we heard news of an interesting ruling against William Hill (the bookmaker) following a case brought by the British Horse Racing Board. Is this relevant to flight sim? Well, you decide, but we think it's very relevant. Put simply, William Hill was using information from the British Horse Racing Board database (taken from its website and other publications) in their betting shops to give details about runners and riders to customers. William Hill's defence was that this was perfectly acceptable because the information was in the public domain – i.e. freely available on the British Horse Racing Board website. However, the court found against them and awarded substantial costs to the Board, although William Hill are appealing as we go to press. This has interesting implications for anyone who posts any sort of data on their website. For example, publishing technical data about a particular aircraft, despite it being freely available on the manufacturers website, could lead to a claim against you, especially if you have a 'pay-for' site. You have been warned! Worrying times for anyone who wants to pass on information that they haven't written themselves.

It's a pity that there's such a risk of getting involved in litigation, when all that most of us want to do is have some fun flying aircraft on our PC. Anyway, fly safely and if we don't see you in the sky we'll see you in court!

Dermot Stapleton
derm@pcpilot.net

NEWS

Typhoon Winners

Well done to Mr. M. Del Perugia who won first prize in our Eurofighter Typhoon competition. He gets a superb desk model of this amazing aircraft. Runners up that got some Eurofighter goodies were Geoff Connolly, Colin Clarke, Martin Hajdukiewicz and J Hawkins. Many thanks to everyone who entered and there's another great competition in this issue to win a rather nice Cessna print.

Magenta News

Enrico Schiratti of Project Magenta has told us about some exiting new developments on their glass cockpits. Enrico said "We have just released the first screenshot of the upcoming Airbus-Type MCDU which will complete the flight management system which currently includes the Airbus Glass Cockpit and the FCU. At the same time we've just released all-new demos of the Boeing-type Glass Cockpit, MCP and CDU, which includes the new graphics as well." To find out more take a look at www.schiratti.com/magenta/news.html

TecPilot Takes Off

The team at TecPilot proudly announced the arrival of their exciting new web resource on 30th May. After a huge amount of work the new site is ready to bring serious flight simulation enthusiasts together in an 'aviators' environment dedicated to making 'Simulation Meet Reality'. You can find out more from the TecPilot demo site at www.tecpilot.com/demo/index.shtml.

World Flight 2001

The next World Flight (www.world-flight.org) charity round the world trip by flight simulator is taking shape and is provisionally set for 8th to 13th of November. It's going on longer than before as they'll be visiting all five continents and unusual airports like La Paz. This year, the donations will be made in the form of a raffle and there's going to be some fantastic prizes. The team are still in need of a wide-angle projection monitor, so if there's an old one lurking in the training department of your company, contact daren@world-flight.org.

COMANCHE 4 ANNOUNCED

Computer developer and publisher NovaLogic, Inc. has announced the upcoming release of the highly anticipated fourth instalment of the Comanche series, based on the U.S. Army's next generation armed reconnaissance helicopter - the RAH-66 by Boeing-Sikorsky.

Comanche 4, due for release in towards the end of the year, is the latest in the popular series which has sold over 2 million copies around the world. Novalogic plans to give players a taste of the thrill and excitement of going into battle as a Comanche pilot. The helicopter's versatility in reconnaissance, ground attack and air combat roles will be emphasized in the game's all-new missions. Pilots will get to use the Comanche's famous low-altitude capabilities and swoop into real-world locations, including urban settings and rural environments around the world such as tropical islands, desolate deserts and lush, tree-laden jungles.

As you'd expect, the developer's are planning to include stunning graphics, with realistic rotor wash effects both on the water and the ground. Comanche 4 will also feature a 3-D virtual cockpit and weapons of destruction including the 20mm cannon, 70 mm rockets, air-to-air and heat-seeking AIM-9 Stingers and the laser-guided AGM-114 Hellfire missile. Chopper pilots will also have to dodge fire from ground troops wielding hand-held Stingers.

"This will be a very fun, fast-paced game which is easy to fly, so that players can focus on enemy air and ground attacks," said Wes Eckhart, producer of Comanche 4. "Plus we've got some brilliant multiplayer action planned on NovaWorld, with up to 32 players fighting it out online. It'll blow you away."

Keep an eye on www.novalogic.co.uk for more developments.

LEADER OF THE JET PACK

With all the pundits advising that flight simulation is dead as a genre for gaming companies, it's good to see Novalogic proving them wrong. As well as the new Comanche 4 mentioned above, they've just released three of their classic titles in a new Jet Pack compendium. You can get another chance to fly F-16, F-22 Raptor and MiG-29 Fulcrum and there's the added novelty of being able to fly them all against each other in what the publisher's describe as Novaworld's integrated battle space. You can get more details from www.novalogic.co.uk.

ALL ABOARD!

Microsoft's latest offering, Train Simulator, is now arriving at a shop near you. Although it's got no aeroplanes in it, there has been huge interest from flight simmers if the big websites are anything to go by. The software is completely different to Flight Simulator and it was developed by a separate team at Microsoft. There are six railways and eight different engines – two steam, three electric and three diesel. It's got an engineer's handbook plus tutorials and in our opinion it's going to be as big, if not bigger, than Flight Simulator. Although no commercial publishers we asked would be drawn into any firm commitments, we've heard privately that one or two are already researching the possibilities of add-ons such as different tracks, trains and adventures. There's a dedicated area of the Microsoft site - www.microsoft.com/games/Trainsim and if there's enough interest from readers we may take a look in a future issue. Rumours of a rival railway sim with far superior cabs but bugs galore, called Train! Have been strongly discounted.

COMBAT ACES

As we went to press Just Flight announced the release of Combat Aces, their latest expansion for Combat Flight Simulator 2. Featuring 20 different aircraft from WW1, 70 missions, five campaigns and authentic period scenery, this add-on has been eagerly anticipated by fans of WW1 combat. Combat Aces was developed by Alpha Simulations, the team behind Harrier Jump Jet and Air Power – The Cold War and when we previewed it back in Issue 9 it certainly looked impressive. Neat touches in the program include ground crews calling "contact" when you start your engine and you can even fly as The Red Baron or pilot a Zeppelin to raid London. There'll be a full in-depth review of Combat Aces in the next issue of PC Pilot, once we've had a few hours in the cockpit. It's on sale at £24.99 and available from the Just Flight website www.justflight.com and in most major shops.

CAPTAINS SPEAKING

FROM ALDERNEY TO ALDERGROVE

The CD presses at Just Flight have been working overtime in recent weeks. As well as the Combat Aces add-on for Combat Flight Simulator 2, the Cambridgeshire based flight simulation company has released another two new products for Flight Simulator 2000, Captain Speaking and Great Britain & Ireland, both priced at £24.99 each from www.justflight.com. Captain Speaking is a new voice controlled adventure package that generates its own ATC and includes 37 adventure flights that have different conditions every time you fly them. Great Britain & Ireland is a huge airfield scenery expansion that includes over 240 airports as diverse as Heathrow and Halfpenny Green. The final batch of their FS Classics budget range is also out and includes Air Power – The Cold War, Classic Airliners 2000, L-1011 Tristar and RAF 2000, all in DVD cases and priced at £9.99. Sales Director Roger Large, sporting his trademark frock coat, stovepipe hat and whiskers said: "Yes, we have been very busy, but hard work never hurt anyone. Now, if you'll excuse me, I must get back to my dark satanic mill and flog any shirkers that the boss has noticed."

PROJECT 1 IS ON ITS WAY

A new standalone flight sim called Project 1 from Third Wire Productions has been announced that will offer four flyable aircraft: the McDonnell-Douglas F-4E Phantom II and A-4 Skyhawk, the Lockheed F-104 Starfighter, and the North American Aviation F-100 Super Sabre. The campaign setting is fictional, leaving the way open for a Vietnam setting for later third party releases. The choice of aircraft reflects the desire to balance air and ground action, with the F-4 Phantom II particularly notable as a multi-role aircraft.

Project 1 will span the 1960s, while the dynamic campaign offers increasing challenges from aircraft like the MiG-17 and MiG-21, Sukhoi Su-7 and Tupolev Tu-22. Beginning with guns-only combat, Project 1 will introduce guided weapons as time passes.

The simulator is designed to allow the pilot to assume a mercenary role, mixing finances with resource management and adding a strong role-play element to the software, broadening appeal to the casual simulation fan. Multiplayer options are an important part of the design and will be in place from the day of release, planned for mid-2002.

WE'RE SELLING OUT!

Don't worry, we're not selling out to the competition, but we are selling out of back issues! Issue 6 has now gone and stocks of other back issues are running low. We plan to release another CD to follow up our very popular 1,2,3 CD, but in the meantime the best way to guarantee stocks of your favourite flight simulation is to take out a subscription. Don't forget you can get six issues for the price of five or twelve for the price of ten and a free binder. For more details, have a look at our website www.pcpilot.net or the subscriptions form on page 61.

Orlando Scenery

SimFlyers Associated announced the release of their new Orlando International (KMCO) scenery for Flight Simulator 2000. It's available for download from their website www.simflyers.net. This scenery is shareware and costs 16.50 Euros (about £9.00).

More Aircraft on The Aerodrome

The popular WW1 free aircraft download site, The Aerodrome, has announced three new machines for Combat Flight Simulator 2. There's an Albatros DV, a Nieuport 17 and Captain Eddie Rickenbacker's Spad. You can check them out at www.aer.ip3.com.

Affiliate success

The PC Pilot affiliate scheme is now over eight months old and so far the leading sites for successful referrals are www.migman.com, www.fsnordic.net and www.wingsofhonour.com. Cheques and prizes will be going out to all the sites in the near future and if you would like to get your site included in the scheme, please send us a mail to mail@pcpilot.net.

Where's X-Plane?

Austin Meyer has told us that there won't be another update for X-Plane until later this year. However he has promised some amazing effects when it comes out, including modelling for up to eight engines, speeds of Mach 30 (thirty!), 3D gauges, a new interface and lots more! Take a look at www.x-plane.com

Three Aces in Hand

Microsoft and VR1 have announced that there'll be another generation of the online multiplayer combat sim, Fighter Ace. A major design goal for Fighter Ace III is to make the simulation more challenging but also easier to learn for the novice. A naval component will be added, including battleships and carriers with appropriate aircraft. Radar and supply systems will be revamped, so that destroying the enemy radar will be a strategic goal. The graphics engine will be improved along with new lighting effects. A revised squadron management system and chat interface will make it easier to communicate with other pilots and load times will be reduced. Testing will be conducted through the summer, but no release date is confirmed as yet.

IN OUR OPINION...

This column normally features the opinions of a leading figure from the flight simulation community. However, PC Pilot were recently asked for our opinion by the Royal Aero Club Trust and we submitted a delegate paper to the 'Flying for Youth' national conference held at the Royal Aeronautical Society in London. The Trust is keen to get more young people involved in aviation and a number of senior figures from aviation and youth bodies, including the Air Cadets, Air League and British Model Flying Association were present. The conference acknowledged that flight simulation has an important role to play in getting young people interested in flying and it was pleasing to get such a positive response. Our paper is reproduced below and you can find out more from the Trust's website www.royalaeroclub.org/trust/trust.htm

Ever since the days when static cockpits salvaged from crashed aircraft were used to familiarise trainee pilots with the controls of a machine, there has been a crucial connection between real and simulated flying. The cumbersome Link trainer has given way to highly sophisticated, multi-million pound full-motion simulators that are virtually indistinguishable from real aircraft. These fantastic devices are normally the preserve of air forces or airlines and in some cases are more expensive than real aircraft. However, over the last fifteen years, as the personal computer has slowly taken over our lives, it has made access to simulated flying both possible and affordable to a large slice of the population.

It is estimated that there are over six million serious flight simulation enthusiasts worldwide and millions more that dabble with computer games based around flying. The numbers of serious 'digital aviators' are still growing as each new and more authentic piece of software is released. Modern flight simulation programs can be broadly split into two categories. By far the most popular are those that fully replicate authentic aircraft, systems and procedures and these are classed as 'serious' simulators. Equally authentic (in most cases) but with their roots in the computer games camp are the so-called 'combat' programs that replicate air fighting in everything from a Sopwith Camel to a Eurofighter.

Computer-based flight simulation is a huge hobby with a myriad of different aspects and attracts enthusiasts from eight to eighty. Modern software boasts fully authentic flight models, with aircraft that handle exactly like their real-world counterparts. Simulated planes possess highly detailed panels that replicate every knob and switch from the real thing, as well as controls and surfaces that work exactly as they should. This quest for total realism has gone a long away to making flight simulation a credible alternative to real flying for many pilots, for whom age, illness or cost have become factors that limit their real aviation. Many flying instructors are now acknowledging that flight simulation programs can help people learning to fly and even the Defence Helicopter Flying School uses a PC-based flight simulator to help train RAF and Royal Navy helicopter pilots.

There are many benefits to flight simulation, not least of which is the price. A good flight simulator program can be obtained for under £50 and will provide the user with an authentic flying experience in a variety of aircraft from a Cessna 172 to Concorde. Modern simulator programs can utilise correct air traffic control procedures and with real-world scenery, the simulator pilot can navigate from one authentic airfield to another. Whilst flight simulation programs authentically replicate real weather conditions, they have the advantage over real aircraft in that they are never grounded by poor weather. Your flight simulator will (rarely) be impossible to fly because of an engine problem and they also possess an impeccable safety record! All this for less than the price of an introductory flying lesson.

Flight simulators have huge educational benefits for anyone learning to fly or as a means of getting young people interested in flying. Just as previous generations gained their enthusiasm for flying from books, films and making aircraft models, today's youth can become familiar with aviation through the medium of their PC. Rest assured that if computer simulations were around when Biggles topped the bestseller lists, there would have been a Biggles computer game available. Any twelve year old having fun with an aviation-based computer game has a good chance of progressing, via a serious flight simulator, to becoming a real pilot. But, are today's young people really still interested in aviation, or have Pokemon and designer clothes taken over where Airfix kits left off?

For the past two years, each November, a group of flight simulation enthusiasts have climbed into the replica cockpit of a Boeing 757 and flown around the world over three days and nights, stopping only to refuel their aircraft. The flight is made using the correct flight plans, charts and procedures of a real airline and the skills required are exactly the same as for a real 757. The group is known as World-Flight and the aim of their flight is to raise money, through sponsorship, for charity.

The cockpit and computer simulator used by World-Flight is home built, but it's a fully functioning replica of a real 757. It is identical to the multi-million pound simulators that airlines use to train real pilots, with the exception that it's based around the same type of personal computer as the one on your desk.

As well as real airline pilots, first officers, engineers and crew members from real airlines, World-Flight has help from ground staff and a whole host of other unsung heroes who are interested in flying and want to do their bit for charity. As well as this army of seasoned professionals, many young members swell the ranks of World-Flight. Although some of them are not old enough to hold a driving licence, this hasn't stopped them from helping to fly a Boeing 757-200 around the world. Among their flying crew this year is Gary Oliver, who is currently studying for his GCSEs and 2001 will be his second 'tour' with World-Flight. Tom Evans is also a GCSE student and a 'first year' crewmember. Another rookie to World Flight, but not to flying, is Alex Rowe, who has already got his PPL. Alex will be helping to fly the 757 this year and then it's back home to carry on preparing for his 'A'-Level exams.

World-Flight is an excellent example of how flight simulation is helping young people get involved in flying, as well as contributing to a popular charity. Their professionalism and attention to detail has impressed a number of companies involved in aviation and commercial sponsors include United Airlines, BAA, Aerad and Just Flight.

A great benefit of simulated flying is the ease with which young people can get involved. The obvious way is via the PCs in their homes and schools, many of which are now sold with a flight simulator bundled in as part of the software package. We recently saw Tony Blair and Microsoft's Bill Gates shaking hands and promising that all British schoolchildren would soon have access to the Internet. Perhaps the flying community should lobby to have a flight simulator included in this generous offer. It might ensure that our young people get exposed to aviation instead of some of the more dubious features on the Internet.

As well as simply flying aircraft, flight simulation also offers the chance to learn about computer programming and aircraft design. The 'open' structure of many flight simulation programs allows the end user to modify aircraft and scenery, or even design their own. There are literally thousands of aircraft, scenery and other expansions for flight simulators, freely available on the Internet. Amateur enthusiasts design most of these, and the anonymity of the Internet means that youth is not a barrier to credibility. In fact, there are some commercial developers with many years experience at designing expansions for flight simulators, who are hardly out of their teens. One popular flight simulation program has an aircraft design feature included and this is used by a real aircraft design company to help them design wings and see the effects of structural changes on aircraft handling.

Flight simulation has fostered a great community spirit and the hobby is not short of clubs. Probably the most prolific are the virtual airlines (VAs), where a group of flight simulation enthusiasts band together under the umbrella of an airline. The airline is structured exactly like a real one, with pilots, crews and administrative staff. The virtual pilots conduct scheduled flights according to the virtual airline's timetable and post reports of their flights on the website. This may seem odd at first glance, but it means that you are no longer flying alone and also adds a sense of purpose to your flights. Anyone can set up a virtual airline and many of them are run by and for young people.

The importance of flight simulation to fostering interest in aviation cannot be stressed highly enough. Today's youth do not see Battle of Britain pilots as role models, they learn about them in history lessons. Nowadays, nobody dashes outside to look up when an aeroplane goes overhead and air travel is almost as mundane as any other form of public transport. However, it's still a fact that once you take someone up in a light aircraft, they're usually hooked and start asking how much it costs. It would be impossible to give vast numbers of young people the exhilarating experience of flight, but most of them can get access to a PC and from there they can easily take to the simulated skies. ■

PC Pilot Magazine

ON THE CD

PC PILOT
DAWN OF ACES
ACTION FROM WWI WITH AN ONLINE COMBAT PROGRAM
WARBIRDS III
THE LATEST AND BEST VERSION OF THIS ONLINE BEAUTY
FLANKER 2.5
ALL THREE VERSIONS OF THE UPGRADE, PLUS MISSIONS
BATTLE OF BRITAIN
SOME NEW TERRAIN FOR EMPIRE'S POPULAR SIM
GROUND ZERO
RON WALKER'S AMAZING HOME-BUILT FLYING PROGRAMS
SFSPC DEMO
A SOARING FLIGHT SIMULATOR, DESIGNED BY EXPERTS
RIPMAX RC SIMULATOR
A GREAT DEMO OF THIS NEW MODEL FLYING SIMULATOR
AND THERE'S MORE!

We've got some really top quality performers on our latest CD and the stars of the show are WarBirds III and Dawn of Aces from iEntertainment Network. These are fully flyable offline, but to really appreciate what they are capable of, you need to sign up online. Full details of how to get an account are in the excellent PDF manuals, otherwise check out their website at www.iencentral.com We'd like to pass on our thanks to Jay Littman, the Executive Producer of WarBirds III and Dawn of Aces for letting us include these two great combat programs. Normally you'd have to spend quite a bit of downloading time to get your hands on them. We've also got loads to fly, with gliders, model aircraft and some really superb little flight sim programs from Ron Walker. If you have any problem getting the menus to run, go to 'My Computer', left click on the CD icon and select 'explore'. Then open the folders as required.

WARBIRDS III

Elsewhere in this issue you'll see our review of WarBirds III, the latest incarnation of the highly popular online combat program. If you like the sound of it, we've got the complete installation on our cover CD, for PC and Macintosh. Make sure you've got DirectX and then double click the icon to unpack it. Once it's installed you can fly offline to practice as much as you want, or check out the PDF manual that's also in the Warbirds III folder for details of how to sign up for an account. Otherwise, you'll find loads of information on their website at www.iencentral.com/warbirds

DAWN OF ACES

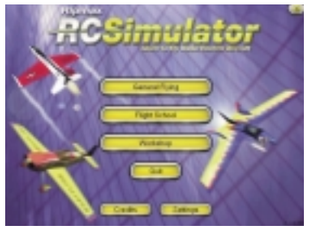
From the same team that brought you WarBirds comes Dawn of Aces, an excellent online WWI combat simulation. Like WarBirds III, you'll need DirectX to get it running and you can fly offline as much as you want. We've also included the Mac version. For a complete breakdown of what it's all about, go to www.dawnofaces.com We've also included the manual in PDF format. You'll need Adobe Reader to access the manual and in case you haven't got it, this is also on the CD.

BATTLE OF BRITAIN

Inspired by JayP's scenery expansion for Empire's Battle of Britain, Len Hjalmarson decided to give the Garden of England a complete makeover. You can read about how this is done on page 48, where you'll also find instructions on how to unzip this new terrain into Battle of Britain. As a bonus we've also included Captain Farrel's repainted Hurricane, that Len has tweaked a bit more.

RIPMAX RC SIMULATOR

Ripmax RC Simulator is an advanced radio controlled aircraft training and recreation program for the PC that the makers tell us is light years ahead of the competition. It's certainly a novel idea and if you've never flown radio-controlled models you'll find it quite exciting. This great demo is a limited version of the program designed to allow you a look at what RC Simulator has to offer. While all the features are visible, only a handful are accessible in the demo. Flights are limited to five minutes each while the program itself will expire 15 days after installation. For more information, take a look on www.rcsimulator.com



FLANKER

Many apologies to anyone who had problems running the Flanker 2.5 upgrade on our last CD. We downloaded a 'spare' version from a mirror site while www.flanker2.com was temporarily unavailable and it must have been corrupt. Guess which one we put on the CD? Anyway, now we're pleased to include the upgrade in non-Voodoo, Voodoo 1,2,3 and Voodoo 4 & 5 versions. There's also the huge file of training missions (115Mb) to help you get to grips with this brilliant sim.

SOARING FLIGHT SIMULATOR

Gliding simulators are always fascinating subjects. We were pointed to this novel program called SFSPC 4 (Soaring Flight Simulator PC 4.0) by our ATC expert Dalibor Jovanovic, who's also a glider fan. SFSPC was developed in Germany by Detlev Schwetzler and Uwe Milde. They are both aerodynamics engineers and experts on flight physics. They were fascinated by flight simulators, but often disappointed that expensive programs sometimes contain severe errors in flight characteristics. They tried to do better and here is the result. It has been put together over seven years in their spare time and they had advice from glider pilots and instructors. We're very pleased to have a demo version for you to try and they'd love your feedback to them via their website www.sfspc.de Unpack the files to your C: drive or a folder, don't try to extract to the CD, which seems to be the default. You can set the language as English and press the space bar to get moving.

GROUND ZERO

Ron Walker, an artist who specialises in designs, illustrations, models and animations, recently sent us some amazing little programs. Ron has kindly let us include some of his home built flight sims on our CD and we thought they were extremely impressive. You'll need to copy the sims to your hard drive to run them and you may need to change the files from 'Read Only' to 'Archive'. Ron told us: "These are basically a collection of flight sims, artwork and animations that I've created for use in the games I put together using a piece of software called Flight Sim Toolkit. This was designed in the UK in the mid 1990s and published by the now defunct Domark. Basically, it lets you design any kind of sim you want. The joy of this is that the sims are stand alone games in their own right and are not simply add-ons to another program. This allows the designer to produce just what he wants, be it military or civil and works in the a way like Corel Draw for flight simmers". We think they're brilliant and we hope you like them. Ron tells us that some really sophisticated stuff is on the way from the world of FST. We can't wait!

CHARTS

As well as the charts for our latest tutorial in PDF format, we've also included some New Zealand charts for our scenic flight 'They Call This The Big One' on page 46. If you have any trouble accessing the charts, go to 'My Computer', left click on the CD icon and select 'Explore'. You can then open the folders as required.

UTILITIES

Peter Dowson's Utilities

We're pleased to have Peter's latest tools for tinkering with your sim. He's kindly sent us Version 1.70 of FStarRC. This version works with Jeppesen FliteStar/FliteMap 8.3 and 8.31 as well as earlier Version 8 releases. It also changes the FS2000 plan file output format so that the results are usable directly in Wilco's 767 Pilot In Command FMC.

You'll find the latest SDK. This includes documentation updated to match the facilities of FSUIPC 2.511.

There's also version 2.511 of FSUIPC, that solves a few bugs from earlier incarnations.

Adobe Acrobat - If you haven't got Acrobat Reader, you'll need to install it from this folder in order to read or print out the tutorial charts.

Winzip 8.0 - You'll need this installed before you can open any of the zip files on the CD. Please note that this is shareware and you should register and pay if you want to use it on a regular basis.

IMPORTANT - TECHNICAL SUPPORT

The CD and software on it is free and as such, PC Pilot, nor any of the publishers or developers of the software supplied on the CD can provide technical support. The software is supplied very much 'as is' and without support. Enjoy the CD and the software on it!

Parisian Airways

What's new in the skies over Le Bourget?

As anyone will tell you, an International Air Show guarantees the biggest, fastest and noisiest planes being viewed by crowds of aviation fans with gaping mouths. We recently attended the 44th Paris Air Show at Le Bourget and it was no exception. There were 1,800 exhibitors from 43 countries putting their wares on show, cutting deals and pressing the flesh, while some great aircraft roared overhead.

French constructor, Dassault, opened the show by announcing a $2.5bn deal with United Airlines for 100 business jets. Boeing and Airbus, went head-to-head over passenger planes of the future. The Seattle boys unveiled their radical Sonic Cruiser in which up to 100 people will be able to travel up to 20% faster than a normal airliner. Meanwhile, Airbus were sticking to their 800-seat A-380 super jumbo. Both companies derided the competition's projects, with Boeing calling the A-380 a 'paper aeroplane'. Things got ugly when one of their representatives arrived at the Airbus stand and announced that he'd brought them a repair kit for their monster carrier. Then he produced a roll of sticky tape from his pocket!

The mighty Antonov. Make sure no-one's up that ladder when she lights up!

The star of the show was a well-known fat Ukrainian, probably familiar as the model kit you never quite finished. The mighty 6-engined, 246 ton payload, Antonov 225, with 290ft of wing, 275ft of fuselage and 107ft of tailplane. We sat transfixed in the cockpit, as Misha the test-pilot rattled off facts and figures in near-perfect English. The marine-blue instrument panel was populated with a forest of illuminated warning signs (in Cyrillic), antiquated dials, knobs and switches. Strangely enough, the biggest plane at the show had the smallest pilot. We pointed to a cushion on the left-hand seat and Misha beamed. "Here, let me show you living quarters …" he said, leading us aft.

As far as flight simulation went, there wasn't much to see, but being members of the press meant we could crawl over most things. Sogitec Industries (France) had the only machine worth a mention. Their Mirage/Eurofighter-style simulator had some of the smoothest 3D graphics we have ever seen - projected onto a 180 degree screen. We took control of the Mirage 5,000ft above Marseilles. After a period of childish flying where we performed turns and rolls at an alarming speed, 1,000ft above the bay (well, wouldn't you?), the demonstration pilot suggested we land at Marseilles Provence. The green HUD display was centre-screen indicating height, speed and attitude. The Cote d'Azur spread out before us and the pilot talked us through the approach. Speed was 200kts, gear extended, hold the nose up and kiss the numbers on 32R. Sadly, the instructor became distracted as we tried a series of braking procedures and we stepped from the cockpit, leaving the Mirage gently sinking into the Med.

Once out into the sunshine again, Le Bourget's apron was awash with spinning early-warning systems, towering missile launchers and a vast collection of static aircraft including Eurocopter's impressive stable of whirly-birds, Embraer's middle-to-long distance passenger aircraft, Lear Jets by the hangar-full – a real boy's own assortment of aviation hardware. Three days before the show closed, a Swiss court slapped a restraining order on the Su-30 and a single-seat trainer, the MiG-AT. This, they claimed, was part-payment for an outstanding debt by the Russian Government over a 'food for oil' deal they struck up in the early 1990s. The French bailiffs arrived on-site, presented themselves to the proper authorities and while their backs were turned … whoosh! Russia 1 – Switzerland 0.

Meanwhile, a familiar whine caused us to look skyward. A Mirage was on finals, reminding us where we'd parked one earlier. We shrugged, turned away and melted into the crowd … ■

Stuart McAlister

The heavily mortgaged Sukhoi Su-30. Now you see it...

..now you don't. Those Swiss bailiffs were hopping mad!

The F-15 still looks deadly, even when it's on the ground

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Lock On: Modern Air Combat

The Russian Evolution!

Flanker 2.0 arrived with us towards the end of 1999, heralding the first serious simulation of the Sukhoi Su-27 and its systems. Flanker eschewed the finer points of game play and campaign systems to bring the Sukhoi to life. The flight model was unforgiving and weapon systems closely mimicked their real world counterparts. Graphics were quite good, with the best looking clouds we had seen on the PC.

Flanker 2.5 was released on the internet as a free add-on for Flanker 2.0 in April of this year and appeared on the shelves as a new product. This enhancement introduced new flyable aircraft (the MiG-29K), as well as giving movement to naval units and adding air-to-air refueling. Furthermore, updated graphics made use of the newest generation of video cards, and expanded communications and wingman control improved the game.

Not only do naval units move in 2.5, they move at varying speeds and engage one another. The action can be intense and if enemy warships fire on your carrier, you may no longer have anywhere to land when your mission is complete! The added tactical involvement of a naval engagement really increases the fun.

The next generation in this series, LOMAC (Lock On: Modern Air Combat), builds on the Flanker world to create an entirely new product with expanded air and ground action in a fresh campaign environment. LOMAC is said to allow pilots to fly a variety of US and Russian combat aircraft in a dynamic and unpredictable combat situation.

F-15C cruising with extra fuel tanks

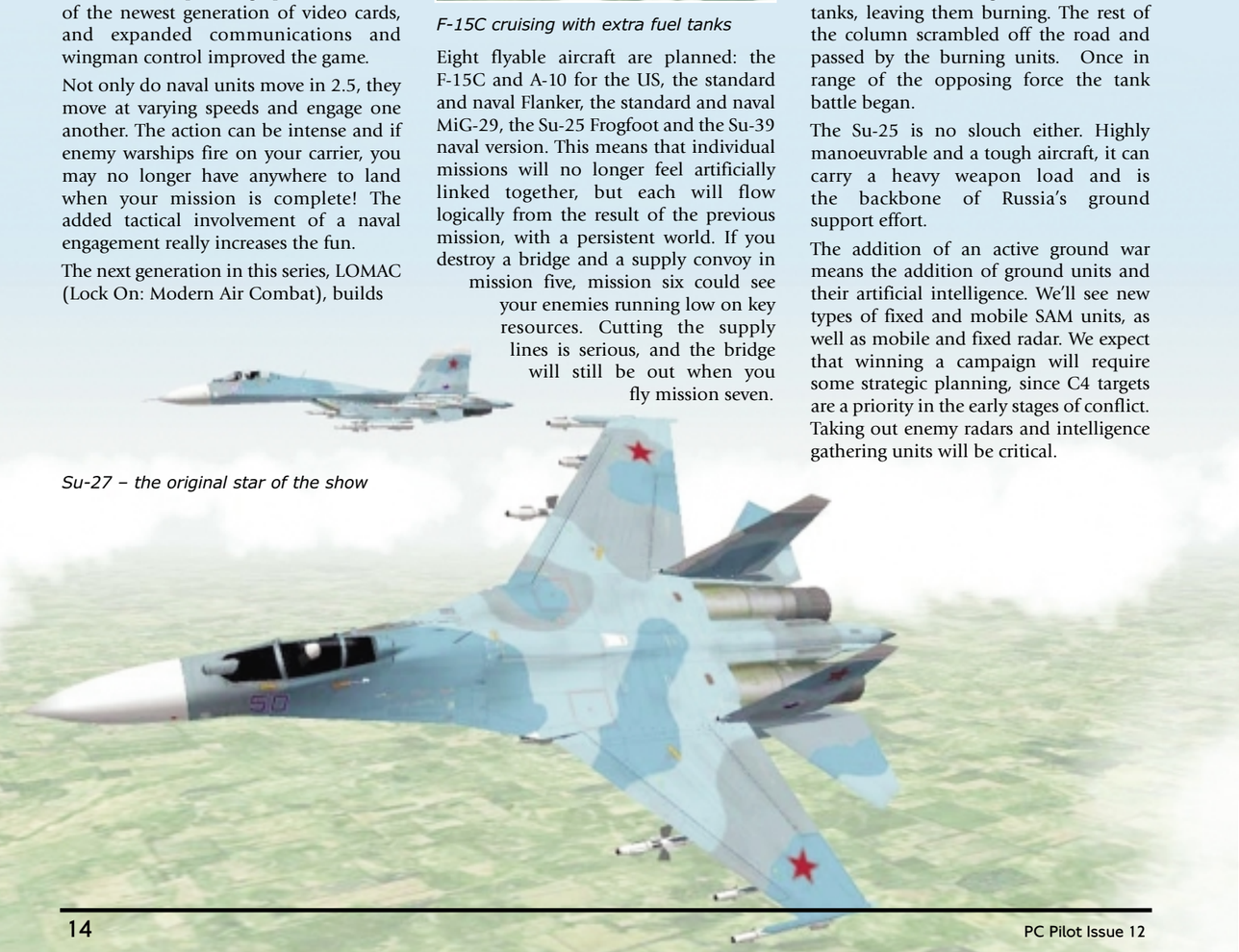
Eight flyable aircraft are planned: the F-15C and A-10 for the US, the standard and naval Flanker, the standard and naval MiG-29, the Su-25 Frogfoot and the Su-39 naval version. This means that individual missions will no longer feel artificially linked together, but each will flow logically from the result of the previous mission, with a persistent world. If you destroy a bridge and a supply convoy in mission five, mission six could see your enemies running low on key resources. Cutting the supply lines is serious, and the bridge will still be out when you fly mission seven.

This kind of persistent world is what the Flanker series really lacked and the integration of a ground war rounds out the experience. Not merely ground action, either, but ground action in a world that has…trees! Early screen shots look fantastic. Imagine flying down in the dirt with your Su-25 or A-10A in this environment. Trees numbered fifty million in the initial build and look great when flying low, as do telegraph poles. Increased variety of weather conditions should make it low even more challenging.

At the E3 show in May, we watched as the demonstrator set up a quick run at a column of tanks approaching an opposing force. The A-10A came zooming in over the trees, firing its depleted uranium shells through the hulls of the tanks, leaving them burning. The rest of the column scrambled off the road and passed by the burning units. Once in range of the opposing force the tank battle began.

The Su-25 is no slouch either. Highly manoeuvrable and a tough aircraft, it can carry a heavy weapon load and is the backbone of Russia's ground support effort.

The addition of an active ground war means the addition of ground units and their artificial intelligence. We'll see new types of fixed and mobile SAM units, as well as mobile and fixed radar. We expect that winning a campaign will require some strategic planning, since C4 targets are a priority in the early stages of conflict. Taking out enemy radars and intelligence gathering units will be critical.



Su-27 – the original star of the show

The Panavia Tornado also appears in LOMAC

This raises the question of AWACS coverage for both sides. The Flanker series offered a simple AWACS type display, but there have long been ambitions to expand this aspect of the game. We aren't likely to see an AWACS control component, but we may see the aircraft itself, which would then figure in the strategic aspect of the campaign. Losing your own systems or taking out the enemy units would blind the respective side and limit flow of strategic data. It would also become critical to protect your airborne intelligence assets, and taking out the enemy's units would be a great achievement. We were pleased to hear that ATC will be also be expanded in LOMAC.

Scalability is another key area of evolution. The flight model, avionics (including radar) and the level of danger from AI (artificial intelligence) controlled aircraft will all be customisable, allowing the novice to tailor the experience. In addition, training missions are expanded to bring pilots up to speed and plenty of instant action missions will be offered.

The operations theatre for LOMAC expands from the familiar Crimean territory of Flanker 2.5 to the east and south, including Russia, Georgia, and the north east portion of Turkey.

The addition of the F-15C expands the gameplay against the Russian MiG-29 and Su-27. The F-15C, while not as powerful a platform as the FA-18, is still the workhorse of the American Air Force. Big, fast and manoeuvrable, with a powerful radar system and able to carry a huge payload, the F-15C will hold its own in the hands of a capable pilot. Close in, however, the MiG-29 easily has the advantage.

Some questions remain unanswered at this time. Is there any chance we will see the ground attack version of the F-15 in the E version? We don't know. Will the naval action include additional ship types? We expect so, but this will likely depend on economic and time pressures.

The Flanker series has been strong in multiplayer features and this remains a critical feature in the development of LOMAC. Community support has also been strong, and has even included new artwork. We expect to see this continue and possibly expand with LOMAC.

One element we would like to see would be more detailed debriefings in the campaign, which would help with game flow. Since a persistent world gives us the ability to create a persona, we should be able to name our pilot and track his career. Hopefully we will see improved mission summaries as well as performance records and awards.

When we spoke to Ubisoft recently they told us that an autumn release for LOMAC was likely, to be followed by their other flight sim title IL-2. ■

Leonard Hjalmarson

Mud moving with the Flanker

THE WARTHOG – A HIGHLY ANTISOCIAL ANIMAL

The first production A-10A was delivered in October 1975. Designed by Fairchild-Republic, the A-10A was officially designated the 'Thunderbolt II', but it's affectionately known as the 'Warthog'.

She ain't pretty, but a superb performance in the Gulf War, in which they flew 8,100 sorties, caused the Air Force to re-evaluate plans to replace it with the F-16 in the 1990s. The A-10A is expected to still be in service as late as 2030 – the equivalent of a Spitfire derivative serving in the Gulf!

The A-10A is most famous for its GAU-8/A Gatling cannon. This seven-barrel weapon weighs 1,963 pounds empty or 3,820 pounds when loaded with 30mm depleted uranium shells. Muzzle velocity is 3,200 fps, with more than 80% of shells hitting a 30 foot radius at one mile. The A–10A is powered by two GE TF34-GE-100 turbofans with 9,065 pounds of thrust each. She can carry 16,000 pounds of ordnance on eight wing and fuselage pylons.

The A-10A Warthog - an ugly but practical killer

Wow – look at those trees!

PREVIEW

Publisher:	Ubisoft	**Price:**	TBA
Website:	www.flanker2.com	**Expected Release Date:**	
Developers:	Eagle Dynamics		Autumn 2001

Falcon V

The Falcon line soars again

In December of 1998 Falcon 4.0 was finally released and redefined the serious combat flight sim genre. A year later, in November of 1999, the second major patch was released. Version 1.08 improved the frame rate and addressed many bugs, avionics, multiplayer and AI issues. Then abruptly, in January of 2000, Microprose closed the doors of the Hunt Valley Studio, and any hope for add-ons perished. This did much to fuel the myth about the death of the flight sim, although sims are still with us and Microprose are no more.

Falcon 4.0 is a multiplayer air combat simulation set in the Korean peninsula with a real-time war in progress. The dynamic campaign system is intense, with an integrated air and ground war that rages around the clock in real time whether you fly or not! Terrain detail was good at the time, but looks dated today. Likewise the cloud system, with layers rather than individual clouds, now appears older, but graphics effects and smoke are nicely done.

The F-16 in Falcon 4.0 looks excellent, even today

The aircraft and weapon systems are highly detailed, so much so that the learning curve for this simulation is high. The original release included a huge binder style manual that could induce a hernia on the way home from your local software dealer. In spite of the ability to access simple avionics modes, Falcon 4.0 never caught on with casual simulation pilots. Perhaps its greatest appeal, apart from the top notch multiplayer features which including transparent exit and entry (the pilot can leave or join a battle in progress, with computer controlled pilots taking over empty spots) is the intense combat environment. Interaction with AWACS, ATC and wingmen is complex and detailed. Voice control software is highly recommended.

User community support is high, with many dedicated online squadrons. In fact, it is the strength of the Falcon 4.0 community that led to the ongoing post-release development, including what came to be known as the iBeta team and the eRazor patch group.

The Ongoing Evolution

The iBeta team had been heavily involved in testing and improving multiplayer code. In the process they had seen the inner workings of Falcon 4.0, and had learned much about improvements that were needed, as well as how to go about making them.

With the death of Microprose, the group became the focus of the changes known as the 'Realism Patches'. These are collections of edits to data files that are used to overwrite the original files, resulting in more realistic performance of weapons, systems and aircraft within the game. Yet another group formed around individuals working to bring the code graphically into the modern world (the eTeam). Incorporating most of the fixes of the earlier iBeta team and the RP team, this group went on to address additional issues, including bringing DirectX 7 compatibility to Falcon, with hardware support for the latest graphics boards. Others created add-ons allowing players to fly other aircraft, like the A-10, the B-B and the MiG-29.

The fixed cockpit in Falcon 4.0

Falcon V

With the kind of intense loyalty Falcon 4.0 has generated, it seemed unlikely that the lineage would end. In fact, a group has emerged out of the ashes of iBeta to continue the Falcon series. We spoke recently with Eric Marlow, the head of G2 Interactive, about the future of Falcon V and asked him about the decision to extend the Falcon lineage. Eric commented that, "The Falcon line of products has been at the top of the heap in terms of immersion and gameplay - and it's held on to that perch for quite some time. This is a brand name to build on".

We wondered whether the new product would involve more add-ons, or an entirely new simulation. Eric answered that G2 is still in the product concept phase and as such they cannot promise any features or functions yet. He did, however, comment on some aspects of the vision.

"The overall position of Falcon as THE high-fidelity flight simulation of choice will not change. Our aim will be to add features that solidify its position as the benchmark simulation…[but] we must explore additional features to attract casual customers that may not have contemplated a Falcon purchase before. This will be offered in the form of new usability enhancement, situational awareness cues, voice-over-training, and fun gameplay modes".

This is good news, because while Falcon 4.0 is an incredible simulation of the F-16 and its combat environment, it has not been accessible enough for the novice. G2's intention is to both open the product to the casual user as well as use advertising dollars to communicate the changes. The casual features will be marketed equally to the more challenging features this time around.

One of our biggest questions involved the graphics architecture. Falcon 4.0 is showing its age and we were hoping that we would see an entirely new architecture in Falcon V. Eric told us that G2 will aim to offer both higher polygon counts as well as bring the engine up to date with support for features like transformation and lighting (the GeForce chips) and DirectX 8.

Falcon V will model block 50/52, since it is the most current and capable aircraft. Other blocks under consideration include the block 40/42 and block 60. Wisely, they also intend to provide the capability for end-users and third parties to create new aircraft, cockpits, etc. This way other favourite blocks can easily be added by the after market mod fans.

The other news is that Falcon V will add the F-15C and E, great choices for mud moving action. Furthermore, this will include the frontseat/backseat integration demanded by many sim fans. This means you will be able to fly in an F-15E as a WSO while your buddy is flying in the front seat.

The proposed theatre for Falcon V is Taiwan. In Eric's opinion, "Without question, the most viable combat scenario is flying against China in a Taiwan Straits theatre. The political sabres have been rattling for some time and as anyone who has kept abreast of the situation and is aware of the dynamics of the region will know, a Taiwan scenario is one of the few current theatres where the US might get involved militarily".

One area still in the conceptual phase is expansion of the AWACS/JSTARS mode. This could even evolve into a theatre commander or force on force option. The Taiwan scenario would also allow expansion of the naval war. Eric commented that, "I can envision much more in terms of available naval platforms, naval radars, naval SAMs, and ship-to-ship combat. Falcon 4.0 has some pretty awe-inspiring ground battles, and I would like to see that move to the blue/littoral regions as well". ■

Leonard Hjalmarson

Photograph: United States Air Force, Air Combat Command.

ADD-ONS A-PLENTY

Tired of flying the F-16? Try the MiG-29 or the B-1B. Did you know that the radar signature of the B-1B bomber is much less than that of the F-117 Stealth fighter? The MiG-29 Mod is produced by the F4 Alliance and is available at the F4 Community website (http://f4c.strikenet.at).

The modification is a two part download. Part 1 is 15Mb and part 2 is 12.4Mb.

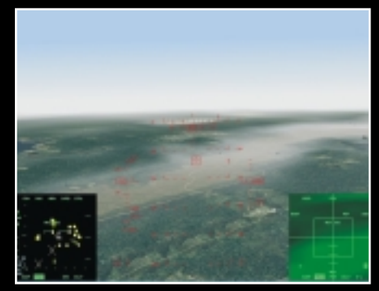
The B-1B lookdown view from an expansion program

THE B1 COCKPIT MOD

The B-1B Lancer is also a product of the F4 Alliance. There are two downloads for this one. The first is only the cockpit views. The second is pretty impressive, and at 50Mb it should be! Here is the information from the F4 Community website.

"The B-1B now includes new views and sounds, though it is a work in progress, and is a good pit for all you mud-movers. It is a 1024x768 cockpit only".

The Campaign Interface in Falcon 4.0. Not quite Windows, but it works!



The 'no cockpit' view is handy for expanding your horizons

Mid -life upgrade MFDs from a third party modification

PREVIEW

Publisher:	G2 Interactive	**Price:**	TBA
Website:	N/A	**Expected Release Date:**	
Developers:	Force 12 Studios		TBA

Fly!II

The dummy's curse

Before we get on with our long-awaited appraisal of Fly!II, we ought to point out that this has been one of the most difficult reviews we've ever had to write since PC Pilot first began. If you don't want to hear us moaning about our problems, skip two paragraphs, otherwise, read on. Normally, developers and publishers fall over themselves to make sure that the press get review copies of their software. If you've got confidence in your product, a good review can generate a lot more sales than any amount of adverts. However, we were promised copies of Fly!II on three separate occasions from different sources and none were forthcoming. Before you think that we're just whingeing because we couldn't get the software for free, PC Pilot's policy has always been to buy software if we aren't sent it. We rarely ask, but as we were told it was arriving, we waited politely. And waited.

In the end we purchased a copy of the US version from SimWare (www.simw.com) and they stand out as a beacon of good service in this whole affair, because it arrived within a couple of days (thanks Fred!). Eventually the PR agency acting for Take Two got in touch and a copy of the European version was sent to our office (not to our reviewers as we requested). We gather this was nothing personal, because other flight sim magazines and websites have reported similar difficulties and one immediately suspects that the publishers did not want it reviewed before it was well on sale. Maybe this is an unfair assessment from a magazine because we didn't get free software quickly enough? Well, our reviewers took an objective look at Fly!II in the same way we treat all software – as if we'd just bought it, which is how our readers judge our opinions. Anyway, enough of the complaints, is it any good to fly?

We were not all that happy with the first version of Fly! when it came out just before Flight Simulator 2000 in 1999. The scenery was disappointing and the whole menu system was clumsy. Its main claim to fame was that the aircraft panels were scrupulously detailed but far too big for the normal screen. All in all, it had the hallmarks of a hurried release. Later, with some patches and some excellent third party scenery it began to look like a promising and different kind of sim. Now comes Fly!II and one would be entitled to expect that there to be some major advances, but we are left with an overwhelming sense of deja-vu. From the newsgroups and websites that are feverishly discussing Fly!II it seems we aren't the only ones feeling this way.

We feel most uncomfortable in severely criticising the efforts of people who may have devoted many months of their lives developing a complex program. But the whole appearance, action and feel of Fly!II gives the impression that it has been put together by a team who were not particularly familiar with the first version. The menus are plainly awful and demand that you keep your left finger on the mouse button in order to handle them. The so-called flight planner is almost impossible to work. Not only do you have to know the name of every airfield in the world in advance, but you must type it in to go there. Even the cheapest of shareware sims does better than this. If you wish to start at Kathmandu for example, you need to know that the main airfield might be called Nepalgunj. Typing in London you get London Kentucky and London Ontario, certainly not Heathrow nor London City airport. There is no way within the Sim that you can find out more, or to place yourself easily where you might wish to be. It doesn't even support a force feedback joystick for crying out loud!

Unhappily, we began by looking at the US version that comes in a standard cardboard box with no patches or extra scenery. This CD ran so badly that frankly it was unflyable and impossible to review, as the frame rates were between I and 2 fps on a 750MHz computer with 256Mb RAM, (well above the manufacturer's recommendations). This experience is what caused the criticisms above to be written.

A New Start

Eventually we received the European version after the constant delays outlined above. It comes on two CDs and is packed in a plastic DVD style case. This is a very much-improved product. If you are going to buy Fly!II make absolutely sure that this is the version you get, wherever you live!

It takes about five minutes to install and you have to have the second scenery CD in its drive for it to work. During installation, you are treated to some beautiful screenshots and this is the moment where we were able to say that this particular version comes up to expectations in many ways, so a look at the positive points first is in order.

At last Fly!II offers us some good textured scenery worldwide. If anything, it is better in certain respects than Flight Simulator 2000, which has become our benchmark these days. Mountains in Switzerland, The Himalayas, Japan and other areas are quite realistic: and coastlines at last almost match the geography books!

The number of aircraft has increased to eleven, which includes three versions of the Bell 407. The flight models seem to be accurate and the helicopters fly well. The aircraft change system is smooth and fast too. They land on water with a splash and on land with authentic puffs of dust. Could this be the answer to the chopper pilots prayer?

Fly!II sports a rather good scenery build/editor, which is great fun, although we only found it by accident. You can add all kinds of buildings and structures to your favourite airports. But be warned, if you go over the top your frame rates will suffer. The documentation for the whole sim is not good and the little manual of 36 pages is less than adequate. Terminal Reality tells you that you can download a full manual in Acrobat from the Internet but that is not good enough in our view. Owners of the original Fly! manual should hang on to it, as most of the buttons and commands are the same.

There is still a host of excellent camera view choices and the ability to add more. The default views especially on the joystick and hat switch are truly bizarre however, and we needed to use the options menus for several minutes to reset and get these right.

The weather and cloud effects are very good and with heavy overcast and lightning selected at night you can frighten yourself to death, as it can be most convincing. The clincher is that those all-important frame rates are now between 11 and 25 fps and are quite acceptable most of the time.

UNFINISHED BUSINESS

For a complete standalone simulation we would normally review it using a team of PC Pilot writers to ensure that we cover every aspect. One by one they reported in and everyone seemed to be singing off the same hymn sheet. Here's what Kenji Takeda thought about the new kid on the block:

Fly!II is full of promise, but no matter how much we want to love it, we can't. The panels are truly exquisite, but are impractical at resolutions below 1280x1024, except for instrument flying. The high-resolution Terrascenery looks fantastic from high altitude, but near the deck it is mushy with a handful of buildings. Roads and rivers are practically absent, even after a 100Mb scenery download, and it's not like the frame rates are anything to rave about either!

However, the flight models are fluid and feel far better than Flight Simulator 2000, especially the helicopter. The aircraft systems are reproduced superbly and you can fly them using real aircraft manuals or the ones in the sim.. You'll have to print out the 322-page PDF file yourself though. Fly!II is a little quirky in its operation, so you'll soon get lost if you don't.

Overall, Fly!II feels like a very unpolished version of Flight Simulator 2000. With FS2002 around the corner we can only recommend Fly!II to experienced simmers prepared for some big downloads. Even then, X-Plane may be a better bet, especially in its Xicat DVD case incarnation. Everybody else, wait to see if Microsoft comes up with the goods. From what we've seen it'll be worth the wait. ■

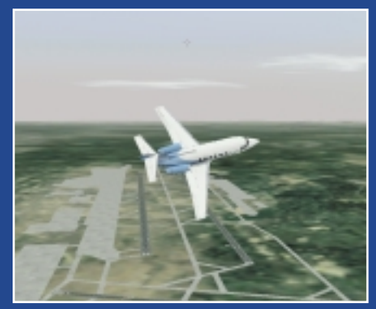
Kenji Takeda

The Terrascenery looks great from here, but isn't worth a 100 megabyte download

The detailed airports are no better than the default ones in FS2000, unless you do them yourself with the scenery editor

The Barracuda and the Aurora must have used the same interior decorator!

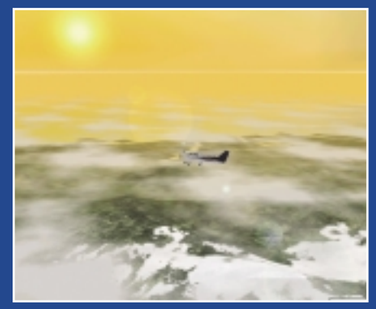
The Bell 407 is our favourite, especially on the water



The Pilatus turns over Frankfurt International

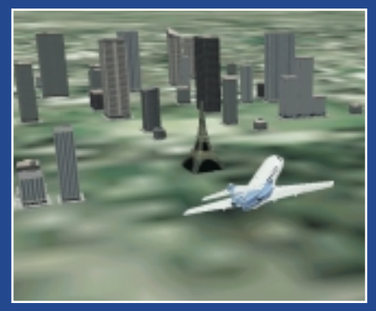
Clouds threaten our Aurora B200 above Key West in Florida

The flight model and panels are state-of-the-art, shame the rest isn't



The Hawk Trainer at the day's end over Mount Cook New Zealand

Bell 407 to the rescue near Mount Everest. Pretty unlikely really, but we had some fun!



There's obviously never been a gathering of developers in Paris – that tower's a bit too small!

Down under - sunrise off the Banks Peninsula near Christchurch New Zealand

How cool can you get with a pot plant in the Pilatus cabin? Nothing in the manual about watering it!

The best laid plans

However, it was not all plain sailing and we have some serious criticisms of this improved version, starting with the flight planner. This could be made much better than the version we ended up with. For a beginner it would be a nightmare, but in any case we would not recommend this sim for a newcomer to flight simulation, because to get it going properly needs quite an experienced old lag to reset many of the defaults. If you type Paris into the planner as your starting point you get nothing. This is poor as not everyone knows that you must type Charles de Gaulle or Orly. Type in Kennedy and you get the Kennedy ranch in Texas. This sort of silliness applies across the whole planner world, so unless you are a pretty experienced pilot you are lost from the start. While the scenery looks as good as say, Flight Unlimited, there are no seasons. This means that mountains you would expect to be snow-capped such as Fujiyama, are bare.

The different aircraft views, which are summoned up by pressing 'v', seem to be rather bad cardboard cut-outs instead of proper aircraft models. This is a distinct come-down from the original Fly! and we were quite disappointed. We would also have liked to be able to change the video and screen details from within the sim and not to have to exit and re-start. It would also be advantageous if the windows were undockable and thus able to be moved and placed on another screen when using a dual screen card.

The maps are also a bit strange. At no time was the aircraft placed accurately on any map. Sometimes it was miles away from its true position. Also, maps outside the USA are almost non-existent. This is a great drawback. With the clumsy flight planner and a minimal vector window showing no coastlines, borders or rivers, good navigation is nearly impossible.

Worth a look?

It would be hard to recommend Fly!II as an entry-level simulator to anyone unfamiliar with the genre or who had not experienced the first version of Fly!. It is promising, but as a truly international and comprehensive product it has a long way to go. The advent of Flight Simulator 2002 is bound to cause people to keep their powder dry, especially as punters like us are getting much more demanding and sophisticated. To be fair it's not as expensive as the competition from Seattle, but with no manual and a DVD case that's to be expected. Overall, we were less than impressed. If Fly!II had been the first product from a new group of freeware enthusiasts, then we would be raving about it. However, as a 'new' version of a reasonably well-executed, if flawed program from a commercial publisher you would have thought some lessons would have been learned. We can only commiserate with any readers who have spent good money on the US version and we'll try to get all those patches on a future cover CD. ■

Christopher Jarman

Typically fine Fly!II panel design in the Pilatus

The Vector map window. Interlaken is there in the crowd of information.

REVIEW SCORE:

Publisher:	Take Two Interactive	**Price:**	£24.99
Developer:	Gathering of Developers	**Release Date:**	Out Now
Website:	http://fly.godgames.com		

At a glance: At a glance: Oh dear! Another couple of months in development and this could have been a five star product. As it is, it's only worth getting if you know what you're up to and don't mind waiting for patches.

SYSTEM REQUIREMENTS: PIII 550MHz, 128Mb RAM, 32Mb 3D graphics card

RECOMMENDED: PIII 1.0GHz, 256MB RAM, 64Mb 3D graphics card

WHAT DO THE OTHERS SAY?

Don't take our word for it. We took a look at www.amazon.co.uk, the popular purveyor of books, software and other media. They have Fly!II up for sale and we were intrigued to see it given a rating of 5/5. This was based on one customer review of the product that is reproduced below:

In case you can't read it, it says:

The Best from the Best 29 May, 2001

Reviewer: An anonymous shopper from United Kingdom

"Terminal Reality has done it again, from the award winning series Fly! Fly! 2K comes Fly! 2, and it keeps on getting better. With new aircraft, over 100+ detailed cities, and all of the world to fly in, you just have to get it. The cockpit panels, have been designed from manufacturers design drawings. You just can't miss this. Go and get it, now".

If you were the 'shopper' that wrote the review, please drop us a mail and let us know how you got a copy on 29th May. We could do with a few psychics on our review team, although if you already work for a PR company, our advice is don't give up your day job!

Airport 2000 VOLUME 3

Wilco stretch those boundaries once again!

When we reviewed the original Airport 2000 from Wilco, the hardware was certainly strained to the limit. But with technology moving at a pace both in terms of price and performance, we are at last catching the developers, so the hardware can finally deliver what the software demands. The upshot of this is that products are now far more useable, giving us the pleasure of magnificent scenery, without turning the PC into a glorified slide projector.

Wilco Publishing are not the most prolific developers but they generally produce top quality products, in many ways setting the benchmark for everyone else to aim for. This latest release in the Airport 2000 series is no exception, providing seven more remarkably detailed airports to add to the other volumes in the set. They come together with three new aircraft of equal quality, provided in a range of suitable liveries with new cockpit interiors to match. These flight decks are designed using much finer detail than the default instrumentation, so they look far more realistic and are much easier to read.

On top of the items we've already mentioned, Wilco have also provided a range of adventures complete with fully interactive ATC. These are graded using the normal Flight Simulator 2000 conventions and are designed primarily as tutorials to get you acquainted with the new airports while you're flying the aircraft that come with the package. Users of AETI's ProFlight 2000 will immediately feel at home here, because it was used to create the tutorials and consequently uses the same interface. Having said that, it can be a bit daunting for a new user because of the sheer number of keyboard commands you need to learn. However, we have to say it's well worth the effort and you've always got the Virtual Co-Pilot to lean on if things get a bit hectic.

Tour the World

Before we prepare for one of the tutorial flights, let's have a look at the new airports Wilco have on offer. Beginning in the heart of Europe with Berlin's Tegel airport, one of three serving the city. It's a well-known landmark that rose to prominence during the Cold War, when Berlin was cut in half by the infamous wall. In fact, the runway was extended at that time to handle the extra traffic created by the blockade. As we taxi past the main terminal you'll see the very chunky (in real life, too) control tower to the left of the main stands, where the static and dynamic aircraft come and go as you watch. If you glance across to the other side of the main runway you'll also see the original tower and terminal buildings, now used mainly for cargo traffic.

The second airport is also in Europe but situated on an island 8km southwest of Copenhagen. Kastrup is Denmark's largest airport, sporting three runways, with more plans for expansion. The most prominent part of the site is undoubtedly the huge delta shaped concourse. This is faithfully reproduced in the Airport 2000 scenery, complete with passenger information screens hanging from the roof, escalators and other internal details.

Moving south we come to Orly, Paris's second airport, which is slowly giving way to its bigger partner Charles de Gaulle, mainly we're told, because of its urban location. Although airports are rather functional buildings, this one is rather pleasing in design, with a futuristic looking tower where you can even visit the controllers. Next, we travel closer to home with the second largest airport in the UK, Gatwick. Situated roughly 28 miles from London it handles up to 48 movements an hour on its single runway. The Wilco rendition is absolutely remarkable, particularly at night, where the central hub shaped terminal comes to life.

They say that our American cousins always do it bigger and better and when it comes to airport terminals we have to agree. San Francisco International has a terminal that covers 2 million square feet, so it wouldn't be difficult to guess what feature to look out for there. Wilco have managed to depict the vastness of an airfield that needs quite a wide angled lenses to get it all in. Not wishing to be outdone, Denver International have the tallest control tower in North America,

Phew, it's busy at Seattle

Wonderful, wonderful Copenhagen

The Airbus lower panel in all its glory

reaching some 327 feet into the air. It also covers an enormous area, with tendril like gates stretching in all directions.

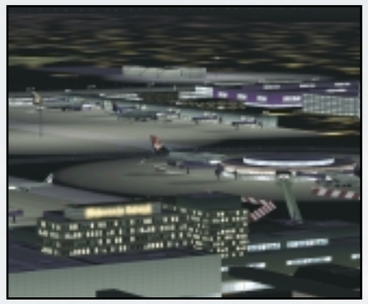
Last, but not least, is Seattle Tacoma International, the primary airport for Washington State, which is surprisingly ordinary when compared to its bedfellows. The terminal buildings are typical of regional airport structures built all over the world. However, Wilco have captured the look and style of this metropolitan airport beautifully.

In fact, all the features of these airports have been painstakingly recreated, with accurate custom textures based on the original buildings. You won't find any refugee shoeboxes from a Blue Peter programme here and the overall effect is superb. The textures are so cleverly designed that you have to get very close before you suddenly realise they are not quite as detailed as they appear to be. It seems that the non-uniform shape and photographic quality of the textures, fools the eye into seeing more detail than is actually there. That's not to say there's no real detail, because there is, and plenty of it. Huge lamp standards, guardrails around the parapets of buildings, baggage trolleys, fuel trucks, people working around the aircraft… the list goes on.

If you wander away from the main terminals you'll see that the landscaping around the airports is not forgotten either. There are hundreds of ancillary buildings, with static and dynamic aircraft scattered liberally around the tarmac. Once again

Airside in Berlin is a feast of detail

The Dornier panel is detailed enough for everyday use



The night views are spectacular – this is Gatwick

A Delta 737 at a busy Berlin Tegel

these are not the cardboard cutouts you get with some scenery packages, they are high quality models that easily pass quite close scrutiny as our screenshots show. You'll also find that they're typical of the aircraft types and carriers found at the real airports.

This brings us rather neatly to the three new aircraft supplied with Airport 2000 Volume 3. There's a Boeing 737-800, an Airbus A320 and a Dornier 328 Turbo Prop. It's quite a varied selection that helps to make the adventures more realistic. They're not going to knock Phoenix off their lofty perch, but nevertheless they are well designed, with solid flight models that perform as expected. The attention to detail around the flaps, spoilers and undercarriage is particularly good, showing the internal struts and bracing with a realistically timed deployment cycle for the moving parts.

The cockpit interiors are visually excellent with high-resolution instrumentation that makes the MFD (Multi Function Displays) in the A320 far more realistic than the Flight Simulator default 777. However, the upper and lower panels mirror the appearance of the real cockpits but they have very few working controls. The myriad switches and knobs are purely for show, and only the bare functions provided in the default aircraft actually work. Fortunately, this doesn't really detract from the performance for anyone who prefers just to hit Ctrl E to get going, but there will be sim pilots out there that demand the ultimate realism… anything less is simply a game.

We've been framed!

So, how does all this visual pleasure fare in the frame count tables? We used a machine with an Athlon 1000 MHz processor wth 256 Mb RAM driving a Creative Labs GeForce GTS 32Mb and a 40Gb hard drive. The results below were fairly predictable, regardless of the airport used.

Flying in circuit with detail levels set to maximum we got 12 – 15 fps while directly in the vicinity of the airport, rising to 18 – 25 on the downwind leg offside of the field. On approach in this configuration it dropped to 10.3 – 8.5 but once we touched down and turned towards the terminal it reached the pits, of 6.5 fps.

However, lowering the overall image quality in Flight Simulator to five changed things considerably. The circuit was just about the same at 20- 25 but on approach it didn't drop below 12 fps and taxiing to the terminal cost us another one or two to just above 10 fps. Sadly this increase in frames is at the cost of most of the dynamic scenery and limits the visual range.

For the purpose of the test we decided to see how much affect dropping the image quality to 2 would have. In this case the circuit was flown at a very fluid 32 – 37 fps, dropping to 16 –20 on approach, with 19 – 23 while taxiing around the now rather desolate terminal buildings.

Ultimately you have to decide whether you can manage with a low frame count, in order to wallow in all that visual splendour… Personally we think it's worth it.

Having flown the aircraft, visited the airports and sweated through some of the adventures, we must say that this is one of the best value add-on's we've seen for a long time. There are definitely better aircraft around, there are probably more detailed airports yet to explore and the adventures once completed successfully are bound to lose their appeal. However, we could make this criticism of most software and as an all round package it has few equals. ■

Joe Lavery

BLUE SCREENS OVER THE WHITE CLIFFS OF DOVER

One final note regarding the adventure feature. During the course of the review we had a few occasions where the adventures would not work, in some cases causing a complete shutdown of Flight Simulator. From the error reported by Windows this appears to be something to do with the cockpit panel. However, the developers are aware of the problem and hope to have a patch out by the time you read this article. Michael Renous of Wilco Publishing reports that the difficulty for them is that it does not affect all systems and some users have had no problems at all. We will keep you posted.

REVIEW SCORE:

Publisher:	Wilco Publishing	**Price:**	£29.99
Developer:	Wilco	**Release Date:**	Out Now
Website:			www.wilcopub.com

At a glance: This is an outstanding all-round package that cannot fail to impress. However, there may be a bug on certain systems and it does kill the frame rate on lesser PCs.

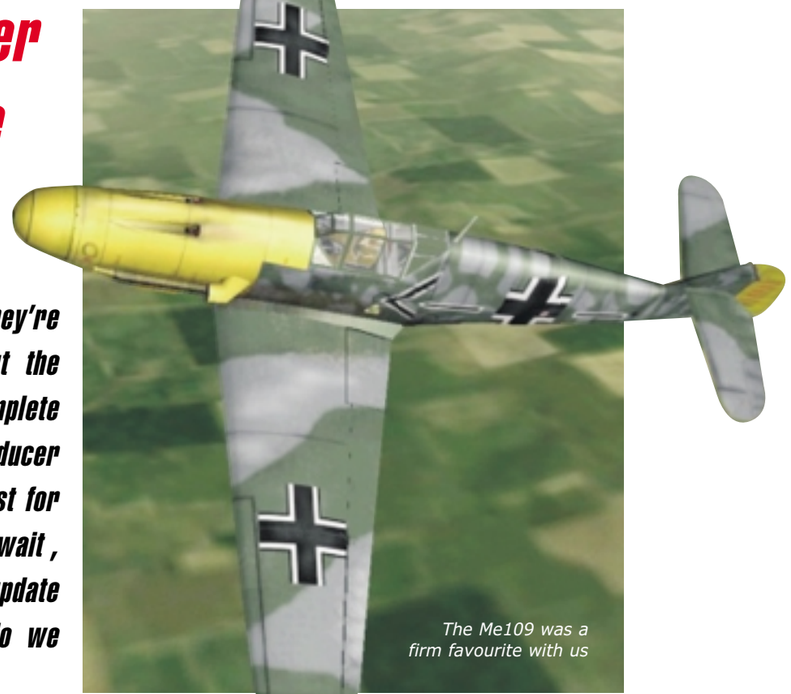
SYSTEM REQUIREMENTS: PII 400MHz, 64Mb RAM, 184 Mb hard drive space

RECOMMENDED: PIII or Athlon 1000Mz+, 133 MHz Bus, 256Mb RAM, 32Mb 3D graphics card

WarBirds III

The original multiplayer combat sim enters the 21st Century

We don't normally review products before they're finished (well, not knowingly, anyway) but the latest version of WarBirds III looked so complete that we asked Jay Littman, the Executive Producer for his thoughts and he said "I would suggest for you to write your article now because if you wait , WarBirds III will be different. With every update the game changes." So without further ado we climbed in the cockpit and went off to war...



The Me109 was a firm favourite with us

WarBirds is an Internet-based large-scale multiplayer combat flight sim using WWII aircraft and weapons. It made its debut in December 1995 and has been praised for its painstakingly accurate flight modelling, realistic gunnery and damage system, winning numerous awards over the years.

This third version is the first one that makes full use of a 3D accelerator. In March of this year WarBirds III entered open beta, the current version comprising an 80 Mb download including high-resolution artwork. Incredibly, WarBirds remains the only combat flight sim where Mac pilots can fly online and PC pilots can fly against them. We asked Jay Littman, IEN's Producer of WarBirds III, how many Mac pilots participate in the WarBirds community and about the future of a boxed version.

"Our WarBirds Macintosh pilots are 20% of our player base. I'm currently looking for a box publisher for WarBirds III to help expand my market share and expose the game to new players and markets."

WarBirds III is the first online simulation we have flown that really looks and feels like a modern air combat flight simulation. The aircraft look great, clouds and smoke are impressive and dawn and dusk lighting are spectacular. Clouds radically change the game. The ability to hide or attack from the cover of the fluffy white stuff is great fun.

It's a fact that the detail of anything on your screen will be determined in part by the number of polygons used to make the image. Previously, the highest polygon count for an aircraft in WarBirds was about 700 polys. The active LOD (Level Of Detail) system dramatically changes the game. Jay commented on the LOD system:

"LOD allows the very high terrain density to run on our current hardware requirements. If it were not for the LOD system our players would require a GeForce III video card or a Pentium IV 1.4 GHz processor to run WarBirds III. LOD also allows for the very high aircraft model polygon count (3,000-8,000 polys per model). The best part of the aircraft system being the almost seamless transitions."

Improved situational awareness impacts on tactical issues, like damage. In earlier versions of WarBirds it wasn't always easy to tell when you scored a hit, or if you did, which system had taken damage. In WarBirds III the impact of machine gun bullets or explosive shells is easy to see and is obvious from a greater distance. We're also told that weather effects will soon be added.

Model behaviour

Damage resolution in WarBirds is highly detailed. The hit bubble is shaped by the aircraft itself and the aircraft is divided finely into components and systems. Damage to an external surface in WarBirds affects flight characteristics. It is difficult to control an aircraft that has taken significant damage to a wing, and damage can weaken a structure without destroying it. Our Me109 took some hits from a Spitfire and in a heavily loaded turn the wing snapped off. In some simulations damage is simplified and often a single hit from a cannon shell can put you out of action. This effect occurs less often in WarBirds and in fact it is harder to score a hit than in many other online simulations.

Recently we experienced a furball in a P-38 against a Spitfire Mk V. We were slow at the merge where the Spitfire came diving into the action, giving us the turn rate advantage. We managed a snap shot with some strikes on the tail of the Spitfire. Then the tables turned and the Spitfire first hit our port engine and then damaged the left aileron. One of our wingmen made a hit on the Spitfire cockpit, killing the enemy pilot outright.

We ran the port engine until the oil was exhausted and the engine seized. It was a rough ride with an unruly aircraft, resulting in a realistic challenge to nurse the P-38 back to the airfield.

Jay Littman told us that WarBirds uses a pressure wave model to simulate high explosive effects. Jay commented on the details of the physics model.

"Each round has many different mechanical and physics properties. These include mass, ballistic Cd, super and sub sonic modifier and fusing properties. The ballistic model uses the same system as the aircraft, so density, gravity, etc are all considered at real time. We currently model over 100 different types of rounds, many rounds being from same weapon, just different types, like armour piercing, high explosive, incendiary and so on."

The flight model of WarBirds III is intact from version 2.77. The few changes focus around the centre of gravity and this now changes with fuel and ordnance loads. This means that the pilot must re-trim the aircraft over time and damage can also affect the centre of gravity.

We flew some of our favourite aircraft to get a sense of the differences in flight performance.

In WarBirds the Me109 E-7 is relatively docile, but applying full throttle on takeoff requires a liberal dose of right rudder to maintain straight tracking on the runway. The aircraft lifts off by itself at 200 kmh without flaps, or about 125 mph.

You want bombers? We got bombers!

Problems with bombers? Try a fighter!

This Me109 at dusk gives an idea of the effects

A B-17 makes the slates rattle right across this town

The impressive cockpit view from the P-38L

Looking down a B-17 Norden bombsight

Our Half-Track with .50s taking on the locals

The ME262 is more of a one-punch prize-fighter than a scientific middleweight

Defend your ship from bandits as waist gunner in a B-17

Crikey! Where did he spring from?

In the air at 200 mph and 5,000 feet, the 109 in WarBirds III can complete a roll in about five seconds. Attempting to hold a 1,500 fps climb results in a stall condition at roughly 75 mph. Recovery at this point is simple, but other kinds of stalls in the 109 can result in a difficult recovery. Luckily, the canopy is quick to open and the chute well packed!

The FW 190 is a completely different animal. The pilot who fails to trim this aircraft will soon find himself riding his parachute to safety on a regular basis. Torque effects do not end once the pilot is in the air, a good reminder that the aircraft will execute a roll faster in one direction than the other. Naturally, the weapon power of the FW190 is much greater than that of the Me109.

The Me262 is another unique aircraft. With four 30mm cannon one wonders why this aircraft didn't fare better in the war? The reasons quickly become obvious. The Me262 is a hit and run weapon, its engines are terribly vulnerable, it accelerates slowly and at speed takes a long time to turn around.

On the other hand, used properly its cannons are deadly. The Me262 in WarBirds, like the real aircraft, is best considered a weapon against bombers.

WarBirds III models 28 fighter aircraft, including the Me262-A1, plus eight bombers and a halftrack with quad 50mm guns. The flyable bombers are the B-17G, B-24D, B-24J, B-25C, JU-52, JU-87, JU-87G and JU-88 A4.

Join a bomber crew

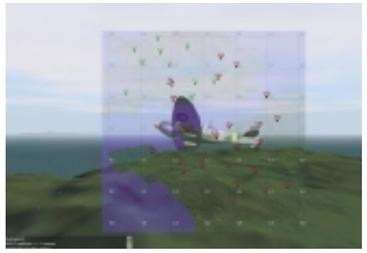
The bombers offer a choice of gun positions, pilot, or bombardier. The player who wants to fly but not shoot can switch to an outside view as his intelligent gunners attempt to defend his ship. Alternatively, if you want to do it all, you can place your bomber on autopilot while you try to defend yourself from the oncoming bad guys. WarBirds allows you to choose from one of eight positions in the B-17, including the pilot, tail gunner, nose gunner, left and right waist, ball turret, top turret and Norden bombsight positions. You can also elect to crew the B-17 positions with your friends.

The bombardier in WarBirds must consider weather conditions, with the target sometimes obscured by clouds. Wind will cause ordnance to drift and bombsight deviation will have to be measured and controlled under adverse conditions. We found it relatively easy to hit our targets, bolstered by practice offline and in Aces High. Dropping bombs on the runways or hangars causes damage according to the size of ordnance, with the rebuild time configurable by iEN staff and is different for the size of the airfield and its location.

Lining up the target was also easy. When a target or airfield appears in the bombsight view, you can use your joystick to make course corrections or modify your tracking. This becomes quite different if there are fighters on your tail! The advantages of a bomber formation and an escort quickly become obvious. Maybe the Fighting 99th is available?

The offline mode is a great way to gain skill, allowing the player to dogfight or fly a bomber against the computer AI (artificial intelligence). We observed a variety of moves from the AI pilots, including good use of the vertical, and the AI tends to take advantage of the strengths of their aircraft while attempting to exploit your weaknesses. Offline settings also allow cheats like unlimited ammo.

Your wingmen will notify you of danger via the text bar. Warnings in the fighters tend to be general while warnings from your gunner positions in the bombers are quite specific. For example, the top turret gunner will tell you that there is a FW190 at four o'clock high. You can then hit the 6 key to take you to the top turret waist if you want to try your luck against the bandit. This is also a great place to use a voice command program like Game Commander. Be warned - AI gunners are quite accurate. Sitting on the tail of an Me 110 or a B-17G is not a good idea. The attacking pilot must learn to fly a curving approach with plenty of speed.



The Nav Map – it's always nice to know where you're going!

Views and navigation

Cockpit detail is quite good and views are flexible. You can set for pan mode or snap views, and you can zoom the cockpit view in or out one step. You can also change the key mapping and save separate sets for swapping on the fly (they are mapped to the function keys). Force feedback is supported and can be adjusted along eight parameters. Having force feedback won't make a novice into an expert, but it does help with situational awareness and increases the fun. External views are supported and can be panned using the keypad arrows or zoomed using the square brackets. On-screen icons identify friendly and enemy aircraft, though these can be turned off by the Host. Icons also disappear when a target is obscured by cloud.

When it comes time to hit the silk you simply hit the ENTER key three times, then watch the articulated pilot diving to earth. Hitting the ENTER key again opens the chute.

The WarBirds world is growing. In May land combat appeared with the release of the M3 Half Track with quad 50 calibre guns. Soon to follow will be the 70 mm Half Track, transport truck and a Sherman Tank. Shortly after a player will be able to drive a Half Track and tow a 105mm artillery gun for strategic placement. Trains are being considered for moving even larger artillery. The next major component to be added will be CVs (aircraft carriers) along with a new South Pacific terrain.

Paratroopers spill out realistically behind this JU-52

Currently it is possible to capture towns by taking the city hall or the church building using paratroopers dropped from a Ju52. Fancy yourself as a budding Kurt Student? Look no further! Towns and villages act as launch points for vehicles and provide artillery support for other parts of the terrain, plus all objects within a town can be destroyed.

Currently, paratroopers are not that smart, but we're told that the artificial intelligence will be improved. Then the truck will also be employed to drive troops to the towns for the capture.

The on screen map overlay is accessed using F1. The first keypress offers a transparent overlay, showing an outline of England and the French coastline. The white arrow you can see pointing south-east near the F3 airbase marker is our Me109, showing our current position and direction, with our aircraft at the base of the arrow. The green bases are friendly and the red bases are enemies, with coloured dots showing friendly and enemy aircraft. The map overlay can be zoomed, and a solid colour overlay appears with the second press of F1. The third keypress removes the map overlay from the screen.

Where do I sign?

If you have never tried online combat, a trip in WarBirds is a great opportunity. It feels similar to many boxed WWII simulations and the choice of aircraft is excellent. WarBirds offers either 'Easy' or 'Realistic' flight models and online arenas and scenarios will be offered for both sets of users. Special events will also be offered for both the novice and the advanced pilot.

For a first flight we'd recommend the A6M2 Zero as it's very forgiving, while the Me109 is a good choice for moderately skilled pilot. The need for speed is met by the P-51D and you may be tempted to fire up the Me262. And why not? But we don't recommend this for online combat unless you have solid experience in other prop sims. The bombers are extremely exciting and they come with some good defences. As a novice you may also choose to crew for a bomber to get a feel for the game.

Another great way to get into the game is to join an online squadron and a trip around www.iencentral.com/warbirds will be useful to find one. Most of the squadrons are organized around specific aircraft, flight tactics or historical parameters. For example, some squadrons will fly only the B-17G while others fly only the Fw190.

Connecting to the Host is simple. Apply for your account on the WarBirds website, fill in the credit information and you will be mailed a password. The Go Online selection is in the main interface and you can't miss it. Choose your weapon, click the menu and away you go! You'll find yourself on the runway in your mount of choice. Hit "E" to start the engines, the same as you do in the offline game and if you need to switch to an outside view use CTRL+E.

Is it worth a phone call?

Previously, WarBirds consisted solely of air-to-air action. Ground vehicles and troops are rapidly expanding the action and creating a new strategic game. The addition of naval units will further expand it and all this in a beautiful new 3D world. Does it get better than this? Well, competition is getting fierce with Operation Flashpoint and WWII Online waiting in the wings. In theory, WarBirds probably has an edge over these as it's been around for a while and its roots are firmly in the flight sim camp. However, complacency could spell trouble and the online arena is expanding fast. You can test it out for yourself using the full versions on the cover CD with this issue or if you prefer you can download WarBirds III from IEN Central: www.iencentral.com/warbirds.

Happy Hunting! ■

Leonard Hjalmarson

TRADE IN THOSE WINGS FOR SOME WHEELS...

WarBirds is rapidly making the transition to a complete air, land, and sea battlefield. Now you can drive one of three vehicles in WarBirds III, including the M3 Half-Track with quad 50s, the M3GM Half-Track with 75mm cannon, and the M4A1 Sherman tank.

It's easy work, using E to start the engine, any throttle control or keyboard, joystick to steer and ; key to shift gears. Switching from driver to gun position is a simple press of the 1 or 2 key. The gun position has a zoom and wide field of view setting using Z and V keys.

The ground vehicles are expanding the air war and making it possible to take bases or towns more quickly. Watch out for massive tank battles!

Try your skills behind the wheel

Blimey, no flaps, no rudder and the rate of climb is abysmal!

REVIEW SCORE:

Publisher:	iEntertainment Network	**Release Date:**	Out Now
Developer:	iEntertainment Network		
Website:	www.iencentral.com/warbirds/wb3.html		

Price: £18.00 (approx) per month and you can fly an unlimited number of hours in any of the WarBirds Air Combat Arena including Dawn of Aces (WWI simulation). £7.25 (approx) per month offers unlimited gaming in WarBirds III only.

At a glance: One of the best online simulations, with a rapidly expanding strategic game. 36 flyable aircraft and ground vehicles in a persistent online world. Detailed damage, flight models and excellent graphics make it an online winner.

SYSTEM REQUIREMENTS: PII 400, 128 Mb RAM, 16Mb 3D graphics card Video Accelerator

RECOMMENDED: PIII 550 or greater, 256Mb RAM, 32Mb 3D graphics card

PBY Catalina

Grab your life jacket... we're going in

One of the most instantly recognisable amphibious aircraft has got to be the PBY Catalina, famous for its role in World War II, where amongst other things it was responsible for tracking down the German battleship Bismarck. This new package from Abacus provides three models of the Catalina, in both land (referred to as Classic) and seagoing (referred to as Boat) variants. In reality these are one and the same aircraft but Flight Simulator does not fully support aircraft that have this dual personality. So the designers came up with two models you can choose from, depending on the sphere of operation you want to try your hand at.

The installation routine is a work of art in itself, with a full multimedia introduction to the 'Cat', taking you on a tour of this grand amphibian. It includes a series of photographs, an original 1945 weight and balance schedule, in-flight video sequences and enough background data to satisfy the most ardent fan. At the end of the introduction you can choose which version of flight simulator you want to install the aircraft for, either Flight Simulator 2000 or Combat Flight Simulator 2. After that, the installation is fully automatic and completed in about a minute. Before we climbed aboard we had a quick walk around, just to kick the tyres and make sure that nothing had fallen off. This enabled us to see the superb modelling and hand crafted textures that anyone who's had a go at re-painting aircraft is sure to appreciate. The external detail extends to things like delicate handrails along the side of the fuselage and rubbing strips at the front. Those characteristic bug-eye Plexiglas observation domes behind the wing are fully framed transparent affairs that allow you to see the detail inside the aircraft. The animation of the props and undercarriage is well executed, although the time taken to cycle the gear is perhaps a little quick.

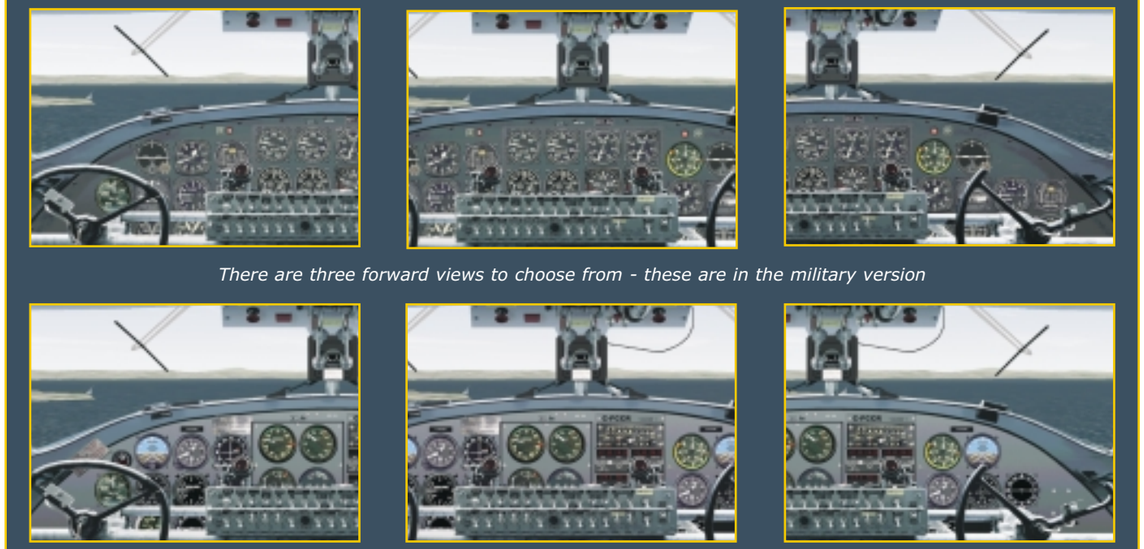
Inside the cockpit you have a photorealistic rendition of the PBY control panel, offering three seat positions, captain, co-pilot, or in the centre (we're not sure if it actually had a jump seat). In addition, the military and civilian variants have different liveries and cockpit layouts, with the civilian version providing a more modern array of instruments that includes a full Com stack. However, when you glance around you'll only see what's outside, there are no other cockpit views provided to frame the screen. On the plus side, you do have rather novel fully operational windscreen wipers.

Once you get airborne the flight model is stable, very gentle and forgiving but has a tendency to stay aloft, which makes it difficult sometimes to bleed off speed on an approach. The wings on the Catalina were apparently not fitted with flaps, so the approach has to be at a much shallower angle than normal. Nevertheless, the aircraft is a pleasure to fly and takes to air fairly readily, although without actual experience on the type it's difficult to determine how accurate this might be.

Overall this is a well-detailed rendition of a classic aircraft and worth a look for the novelty of landing on water. ■

Joe Lavery

The Cat's whiskers!



There are three forward views to choose from - these are in the military version

The civil version has more familiar modern instruments

Whoops, it's one of ours!

There are a myriad of tales about Catalinas, but we heard one anecdote from a distinguished veteran that we thought might be amusing. During the early part of WWII, the citizens of Dundee were criticised by the civil defence departments for their poor air raid precautions. In order to 'ginger them up' a squadron of Blenheims was sent from Macmerry, adorned with paper black crosses and swastikas, to fly low over the town, dropping flour sacks as a demonstration of how easy it would be for German 'tip and run' raiders from Norway to do the same thing. After a successful 'raid', where they flew so low that one air gunner described the wallpaper he'd seen in an upstairs room, the squadron flew out over the docks into the Tay Estuary. It was here that they spotted what they thought was a Dornier minelayer going about its business and flying upriver. They dived into the attack, but at the last minute, just as they were about to open fire, someone spotted the roundel markings and the Catalina (for this is what it was) had a lucky escape. The Blenheim veteran who told us the story has often wondered if the 'Cat' crew returned home to tell an implausible tale about being attacked by German Blenheims!

Not as easy to spot as you might think!

The package includes a full multimedia history of the Catalina

There are two navy liveries - the grey version and the more familiar blue and white livery

Sadly, no wake or other effects but you can land on the water

The paint job on the famous Princess Des Etoiles is particularly well done

REVIEW SCORE:

Publisher:	Abacus	**Price:**	£24.99
Developer:	Ascendance	**Release Date:**	Out Now
Website:		www.abacuspub.com	

At a glance: A new amphibian from Abacus, just the job to expand your fleet and chalk up another aircraft type in the log book.

SYSTEM REQUIREMENTS: PII 500, 128Mb RAM, 3D graphics card

RECOMMENDED: PIII/4 or Athlon 800MHz+, 256Mb RAM, 32Mb 3D graphics card

German Airports 1

German Airports – The (Pre)Sequel

If you're a long-standing fan of Microsoft's Flight Simulator, you probably spend far more time navigating and flying than you do taxiing around airport aprons. However it appears that we all crave for the most accurate renditions we can get of these remote places, where the level of acceptable detail has yet to be defined. So, when we sidle up to the gate in our customised 747, the air bridge moves smoothly into position, baggage handlers and service vehicles leap into action and the passengers can be seen lining up ready for the next flight…are we getting carried away here?

Aha! Just in time for tea at Bayreuth

Until then (and it won't be long), we have a few respectable products to bridge the reality gap, like this latest release from Aerosoft, which revisits eight of the more prominent airports in Germany. Once again adding a host of frame rate guzzling details and some new features to boot. For example, at Munich airport the aircraft docking systems and movable gangways can be adapted to specific aircraft types by selecting the appropriate aircraft's COM frequency. This determines the SafeGate's display height, also the elevation and docking angles of the passenger gangways. However you cannot use all of the gates because some of them are designated for dynamic aircraft tracks.

The airports depicted in the package are the same ones found in the original German Airports 1 collection, with the exception of Innsbruck and Altenrhein, which have been added as a bonus. They make quite a varied collection, from huge international gateways like Stuttgart that incorporate dozens of stands, serving as many different airlines, to small general aviation airfields that concentrate more on flight training and maintenance like Altenrhein, located near the border crossing of Switzerland Austria and Germany.

The quality of these renditions is outstanding, both in terms of the textures used and the sheer diversity of the new buildings. You'll see trees, properly scaled fencing, taxiway signs, lamp standards and where construction work is underway, huge tower cranes that help to complete the illusion. As you taxi in or out of the terminal areas, the dynamic service vehicles, courtesy cars and passenger buses go about their business, weaving between the departing and arriving aircraft. It just underlines the amount of work done by the authors, Thomas Hirsch, Peter Hiermeir and Michael Kopatz.

Of course, this level of detail has a certain overhead in terms of frame rate but using a 1 GHz Athlon system with a GeForce 2 video card. We still managed to achieve an average of 12-16 frames per second, that on approach to one of the most complex airports.

To round off the package you get two quite extensive manuals, the first one covering the installation and a potted history of each airport. The second contains authentic Jeppesen SIDS, STARS and approach plates for every runway depicted, making a total of 74 high quality plates in all. Well worth the cost if you want the ultimate in Teutonic terminals. ■

Joe Lavery

The level of detail extends to the anti-ice spray stand at Munich

Alterheim Tower

Augsberg fuel station

Touchdown at Dresden

Parking at Eaglesbach

Innsbruck, the skier's favourite

REVIEW SCORE:			
Publisher:	Aerosoft GmbH	**Price:**	£24.99
Developer:	Aerosoft GmbH	**Release Date:**	Out Now
Website:			www.aerosoft.com

At a glance: The original German Airports took a heavy toll on your system. This latest version is far more detailed, yet without the expected burden of frame death

SYSTEM REQUIREMENTS: PIII 500, 64Mb RAM, 3D graphics card

RECOMMENDED: PIII or Athlon 1000+, 133 MHz Bus, 128Mb RAM, 32Mb 3D graphics card

From Munich to Innsbruck by Learjet

The Lear heads out of Munich

On the way to Innsbruck

The enroute portion

Here we are at Innsbruck

Notice the difference between the default scenery and the Innsbruck terminal, shown here courtesy of German Airports 1 (Edition 2001) also reviewed in this issue.

Your introductory flight offers quite a challenge

Airline Pilot 1

This is your Captain speaking

Airline Pilot 1 is the latest release from Aerosoft and is a product they hope will make your Flight Simulator flights a tad more interesting. The manual begins by dispelling the romantic perception we all have of what an airline pilot's day consists of. We suggest that for the ultimate realism, you begin this adventure by getting up at the crack of dawn, after preparing a few stale rolls the night before. Call a taxi to drive you around aimlessly for about an hour, (to simulate the ride to the airport). Then hold a crew briefing in the kitchen, with the wife and any other parties willing to play the role, before finally entering the cockpit and firing up your PC. This should just about get you into the frame of mind a pilot has at the start of a typical day.

Joking aside, the program tries to capture the essence of commercial flight from the initial planning and first contact with the tower, through the ongoing high level of communications, navigation and flight management. In fact, it's the whole scenario of what an airline pilot does for a living.

Naturally, you are provided with all the tools to achieve this goal, both in terms of a new aircraft to fly, a realistic ATC environment plus all the documentation and charts necessary to complete the adventures. These are designed to teach you the intricacies of IFR flight, beginning with a NAV intro. This is a sort of tester to see how well you can handle a short hop from Gatwick to Heathrow, in a thick layer of London fog… at night. Who said it was easy! The manual suggests that you should be familiar with the instrumentation, particularly the ILS landing systems within Flight Simulator before attempting this adventure…we tend to agree!

You'll find that flying the other adventures is quite an experience, particularly for those without an IR certification, (which is 99% of the population). This is because, as the producers intimate, they closely follow the procedures and problems associated with real scheduled flights. The ATC is brilliant with plenty of random chatter in the background and in some ways is interactive. For example, when you're taxiing, if you miss the turning you're supposed to take the controller will offer you the next one ahead. The same thing happens in the air, if you get the approach all wrong the controller will vector you around for another approach. Like other products in the Aerosoft catalogue you have a virtual co-pilot to fall back on if the workload becomes too heavy.

The program works quite happily with the German Airports series (also reviewed this issue), which if you have them helps to make the adventures even more realistic. The automated installation routine will install the Lufthansa and Swissair Airbus A320 aircraft, complete with a new more advanced panel courtesy of Andreas Jaros. This freeware panel is an unusual element to find in a commercial product, which we understand will eventually be updated from the author's homepage at *www.flightsimmers.net/fpda/panels/a320.htm.*

This is an adapted Flight Simulator 98 panel that's nowhere near the quality of the Phoenix panels, but is sufficient for the purpose intended here. However, if you have another aircraft/panel set you'd prefer to use, the manual explains how to make the changes. ■

Joe Lavery

The package includes a functional A320 with a custom panel

Our A320 in Lufthansa livery climbs out from Hamburg.

REVIEW SCORE:			
Publisher:	Aerosoft GmbH	**Price:**	£24.99
Developer:	Steffen Gerlach, Joachim Kroll, Jörg Steinhauser	**Release Date:**	Out Now
Website:			www.aerosoft.com

At a glance: Flying a light aircraft in FS2000 is fairly easy, particularly in VFR conditions. This program attempts to show you the difference in flying, (or should we say managing) the flight deck of a modern airliner.

SYSTEM REQUIREMENTS: PIII 500Mb, 64Mb RAM, 3D graphics card

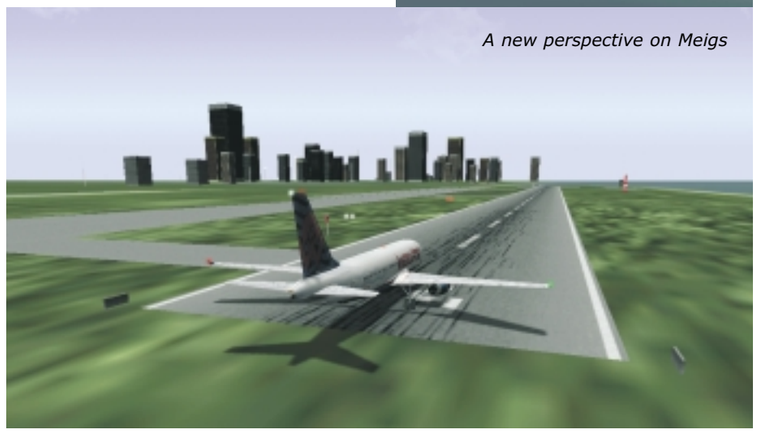
RECOMMENDED: PIII or Athlon 1000+, 133 MHz Bus, 256Mb RAM, 32Mb 3D graphics card

X-Plane

A new case, but is it a new sim?

The Meigs we're more used to seeing

Xicat Interactive has recently released a boxed (well, in a DVD case) version of X-Plane in the UK, which means that there's another alternative to Microsoft's famous series in British shops. We decided that as X-Plane was now beginning to come out of the "experts only" closet, it was perhaps time to have another look at Austin Meyer's baby and see how far it's travelled since our last visit. In case you aren't aware, X-Plane was previously sold directly from the X-Plane website and as a direct import by specialists like RC Simulations. The author, Austin Meyer, releases regular updates to the software and when we reviewed X-Plane back in issue 6 we gave it a healthy four stars.



A new perspective on Meigs

The first thing we noticed with this new version (5.52) is that it's actually already 'out of date'. In fact, the upgrade we provided on the issue 11 CD is more recent, standing at version 5.66. This is not really a big issue for those with Internet access, because the upgrades are provided free from the X-Plane website, although to download an upgrade you'll need either a free connection, or a high-speed link, because X-Plane upgrades are typically around 70Mb. That said, the program is pretty solid and if you're happier flying than tinkering, then you can load a version and use it without the need to update it. The next one is planned for later this year and promises a host of amazing new features, including new panels and modelling.

X-Plane has the nicest clouds!

We're on cloud nine (or is it 9.1?)

We were pleased to see that the Xicat version now comes with a proper installation routine that adds a set of directory entries into your Start Menu\Program Files. These combine with entries in the system registry so you also have the facility to un-install the program properly if you need to. This is a vast improvement on previous versions, which had no method of uninstalling other than simply deleting the whole X-Plane directory. Something that beginners (and even some old hands) to the world of computing would be reluctant to do. In some ways this factor alone has elevated the program from the realms of the knowledgeable but dedicated enthusiasts, to a product that anyone can have a go at.

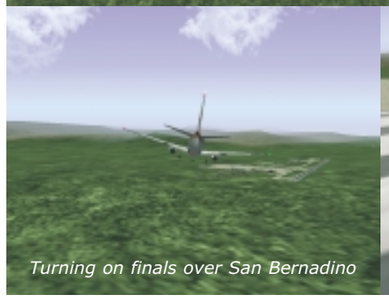
Other enhancements in this release are high-resolution screens up to 1600 by 1224, as long as your hardware supports it. Fully interactive ATC is available and you have the facility to open a flight plan, listen to the ATIS, request vectors, call an emergency and much more. This uses the Microsoft speech SDK 5.0 (also provided on our issue 11 CD). However, as we mentioned in last month's ATC Simulator review, although it works quite well, the voice you hear is very robotic.

High resolution cockpit graphics for this 777

You can file a flight plan with ATC and hear it read back

Austin has added a bit more scenery detail to some airports, although as the screenshots show, the UK seems to have been overlooked somewhat, with airports like Gatwick and Heathrow consisting of little more than runways and taxiways, but sadly no buildings. Having said that, unlike Flight Simulator 2000, X-Plane does come with an integral world maker program that allows you to add buildings yourself. Looking a bit deeper we have to say that the landscaping and cloud effects you get are far better than Microsoft's offerings and running both programs on the same system shows X-Plane to be more fluid. Conversely, the popularity of products like German Airports and Airport 2000 seems to indicate that flight sim pilots are prepared to put up with the stutters for the reality of departing and landing at accurately modelled airports.

X-Plane has some interesting planes – try out the Phantom



Turning on finals over San Bernadino

The textures are amazing

X-Plane has also had a certain amount of novelty that either attracts or repels, depending on your view. For example, that sophisticated weather we mentioned has been tweaked to replicate the atmosphere on Mars to allow you to fly unique 'Martian' aircraft on the red planet. As Austin explains:

"NASA has very exact data on the atmospheric pressure, density, and temperature on Mars. NASA has very exact data on the gravity of Mars. They have rough topographic maps for the entire planet of Mars, and very detailed data for some areas. The laws of physics, which are programmed into X-Plane, are the exactly the same on Earth as on Mars. X-Plane needs atmospheric pressure, density, temperature, gravity, and topographic maps to deliver an engineering-accurate flight simulation. Enter a new level of flight simulation. X-Plane can simulate Mars!"

You also get the opportunity to fly the Space Shuttle, which is quite good fun. However, this type of 'experimentation' serves to put some people off, but X-Plane should not be dismissed as a novelty. This flexibility is also used to allow you to do interesting things like create thermals for gliding and there's also a design program built in so you can make your own aircraft.

With its price point more in keeping with an add-on than a full-blown simulator, X-Plane is well worth looking at and represents very good value. The flight models are excellent and it's infinitely 'tweakable' if you want to change aspects of it. There's also a huge network of fans and a healthy freeware community, not to mention those huge update files on PC Pilot cover CDs! ■

Joe Lavery

REVIEW SCORE:			
Publisher:	Xicat International	**Price:**	£29.99
Developer:	Laminar Research	**Release Date:**	Out Now
Website:			www.x-plane.com

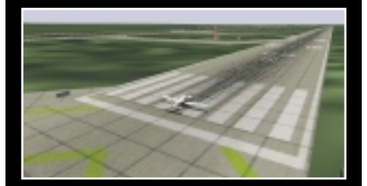
At a glance: If you're looking for a change from Flight Simulator 2000, particularly if you find it a strain on your hardware, X-Plane is definitely worth having at this price.

SYSTEM REQUIREMENTS: PII 300, 96Mb RAM, 3D graphics card
RECOMMENDED: PIII/Athlon 800+, 256Mb RAM, 32Mb 3D graphics card

Spoilt for choice?

We often get asked by readers "which flight sim should I buy?" or "which is better, Flight Simulator 2000, Fly! or X-Plane?" Unfortunately this isn't a simple one to answer – they all have their various pros and cons. Suffice it to say that Microsoft does good scenery, but possibly at the expense of fluidity. Anyway, if good airports are your thing, we've compared a few with the defaults in Flight Simulator 2000.

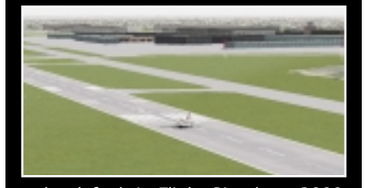
This shows the difference between X-Plane and the default UK FS airports.



X-Plane Gatwick

Gatwick in Flight Simulator 2000

Heathrow in X-plane...



..the default in Flight Simulator 2000

If you don't like the scenery in X-Plane, don't worry! There's a built in World Maker program that allows you to create your own scenery, and it's not confined to this planet!

No, it's not Farnborough on a Saturday night, this is Mars!

FS Navigator

Never get lost again

There's no doubt that programs like Flight Simulator have been directly responsible for the emergence of thousands of highly qualified pilots and navigators, who for the most part have never seen the inside of a real cockpit. Unfortunately, as the number of letters and e-mails we get will testify, there are just as many for whom flight planning, SID's, STAR's and VOR's are just acronyms that other people somehow understand. If you fall into the latter group then you have two choices. You can get the textbooks and learn the hard way, or you can invest in a multi function flight-planning program like FS Navigator. You don't even have to part with any cash initially because this is a shareware product.

The FS Navigator window docked inside the cockpit

If you're new to computing, perhaps we'd better explain the shareware concept. It's basically a method devised by programmers to allow prospective buyers to try before they buy. The idea being that you can use the program, which may be crippled with some limiting factor or perhaps, will expire at some point until you register and pay for it. In the case of FSNavigator you'll have full functionality albeit limited to 20 simulator sessions, after that you won't be able to see the map until you buy a registration key.

Although Flight Simulator 2000 has its own built in flight planner, there are many other easier to use and generally more sophisticated programs available and FS Navigator is just such a product. Written by Helge Schroeder it operates as a navigational chart, flight planner and flight management system. It's a bit different from other similar products because it can display all the navigation objects, extracted from your own Flight Simulator scenery files onto a global map. So, if you live in some remote archipelago and have accurate scenery for your own part of the world, it will feature in the data shown. However it's not a stand-alone product and it functions as a plug-in module within Flight Simulator, accessed by pressing the F9 key. This launches the FS Navigator screen, which is divided into four sections, made up of a search window, flight plan, avionics/autopilot and global map. You can define this to be a full screen display, or size it to fit wherever you like on top of the main Flight Simulator window.

The program has an easy to use interface, with most actions performed using the conventional drag & drop method. Creating a flight plan is simply a matter of holding the mouse over the departure airfield and when the pop-up window appears showing the runway/ILS data, drag it to the flight plan window. You repeat this process for the destination airfield and any waypoints you want to define. Then, set the aircraft's avionics and autopilot in the FS Navigator panel and start your journey.

In the process of creating a flight plan you also have the facility to manually set waypoints. This is a useful tool because you can also set the altitude before and after passing the waypoint, as you would need to do for instance when approaching an airport. In addition, FS Navigator can be used as an aid to VFR flight by setting fix points on the map, allowing you to highlight objects or locations of particular interest. Once completed, your flight plans can be flown in automatic, semi-automatic or manual mode, with all autopilot functions set from FS Navigator.

If you like the sound of FS Navigator, it can be downloaded from www.fsnavigator.com. ■

Joe Lavery

REVIEW SCORE:			
Publisher:	FS Navigator	**Price:**	£25.00 (approx)
Developer:	Helge Schroeder	**Release Date:**	Out Now
Website:			www.fsnavigator.com

At a glance: FS Navigator is an easy to use shareware flight planning and in-flight management system, ideal for anyone who wants to expand their knowledge in this area

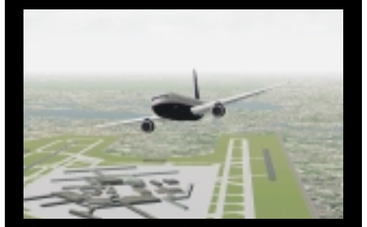
SYSTEM REQUIREMENTS: PII 300 or higher, 64Mb RAM, sound card

RECOMMENDED: PIII or Athlon 800+, 128Mb RAM,

London to Paris with FS Navigator

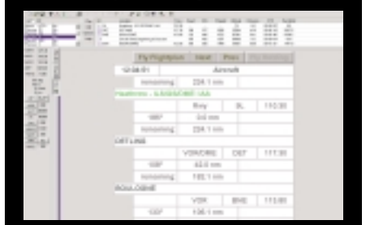
We took a trip from Heathrow to Charles de Gaulle to test out FS Navigator and we were pretty impressed with the results.

FS Navigator docked in FMS mode



Autopilot on, turning onto our heading once clear of Heathrow

Whiteout approaching Boursonne VOR



The completed plan shown in FMS view

Turning onto finals for a perfect automatic touchdown

Note: The 767-300 Aircraft and panel courtesy of Nikolay Poriazov, available from www.flightsim.com.

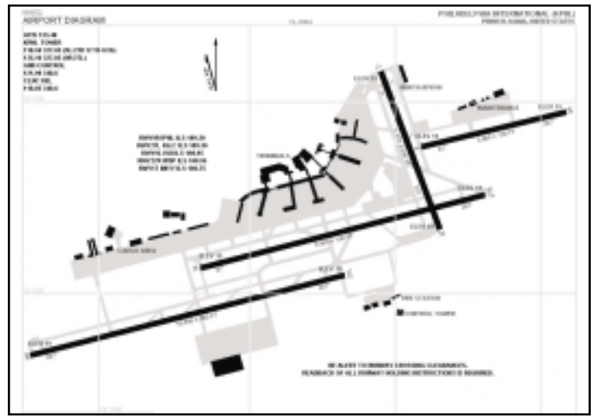
Philadelphia International Airport

PCP Flight 101 is almost ready to dock...

Philadelphia Cream Scenes

The City of Brotherly Love first opened its own airfield in 1920 in order to train National Guard pilots. By the 1980s over $700 million was being spent on this state of the art airport. Only seven miles from downtown Philadelphia, it is said that over 100 million people live within one day's drive from this facility, that is nearly half the population of America. No wonder it is an airport worth upgrading on our flight simulators!

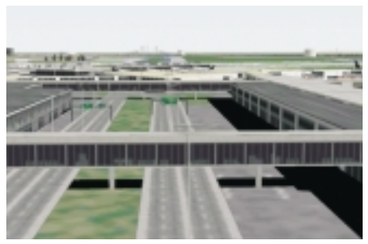
Simflyers - Raffaele Fiore, Cal Lewin and Wolfgang Schwarz are to be congratulated on a well-executed piece of airport scenery. Situated on the north bank of the Delaware River, the busy airport has two main 10,000ft runways, running east/west and two shorter 5,000ft runways, one east/west and one north/south. Much of the business in this part of Pennsylvania is cargo, so there is a large cargo area on the western side of the field. This is shown very clearly in the scenery by great piles of boxes on the hard standing. You need to be careful negotiating them when taxiing.



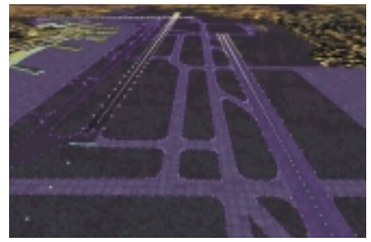
All the details of the airport

The two main terminals on the north are well detailed and there are all the docking stations and a dozen or so static aircraft with various international markings. The maintenance area and fire station are shown in some detail with three fire engines and its own speciality control tower to the south of the airport.

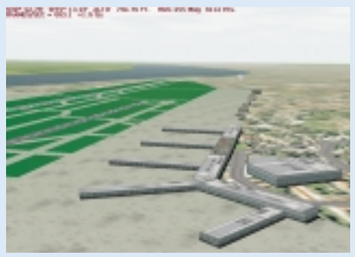
While moving around the airport, the skylines with trees and buildings give a very realistic effect in daylight. At night, with the main lights in the buildings on and the tail lights of static aircraft illuminating their fins, it is very impressive. All taxi lights and runway lights are present, giving a truly lively and exciting feeling to the night traveller.



Roadways around the buildings are carefully detailed



The effects are still brilliant after dark



The default Philadelphia airport scenery in FS2000

The changes after adding the new scenery are little short of amazing

While this scenery does not quite have the enormous detail of say Gary Summons' Heathrow, or the Real Airports we reviewed in Issue 10, it must be remembered that this is downloadable shareware from the web! Thus it is marvellous value and highly recommended.

The files are either available for download from Simflyer's website www.simflyers.net or from www.flightsim.com and www.avsim.com. There is a demo-only file, which runs without textures displayed. Then there are various add-ons and patches also available to enhance the original scenery. Registration costs Eur 16,50 so you will have to work out how much that is in your local currency. For the UK it is about £10. For a currency converter try www.expedia.co.uk. ■

Christopher Jarman

REVIEW SCORE:			
Publisher:	Simflyers	**Price:**	£10.00 approx
Developer:	Simflyers	**Release Date:**	Out Now
Website:			www.simflyers.net

At a glance: Probably not as polished as a commercial product, but extremely well put together shareware of a fascinating airport. Well worth a look.

SYSTEM REQUIREMENTS: PII 300MHz, 64Mb RAM, 8Mb 3D graphics card

RECOMMENDED: PIII 450, 128Mb RAM, 32Mb 3D graphics card

How to get all that heavy metal under control

TAMING THE BIG JETS

Once you have learned a few basic principles, controlling a light aircraft is pretty straightforward. With a flight simulator, you can even be somewhat cavalier about how you fly them. You may get lost, but in most circumstances handling the planes will give you no problems. The transition to airliners should be relatively easy, after all the controls are the same and you have far more excess power available from those turbine engines. Unfortunately, things are not quite so straightforward and the conversion can be fraught with problems. The causes of the difficulty are, in some cases, quite subtle and what's more, to gain a full understanding involves a little aerodynamic theory. When you have mastered a few fundamental techniques, you will find flying your chosen airline operator's colours both easier and more enjoyable, leaving you to concentrate on the important challenges of navigation and cockpit system management.

Check-out your flying and your plane

To test your mastery of airline handling, set yourself the challenge of flying from Edinburgh to Heathrow, possibly using the route we gave you in the airways flying article in issue 10 or try one of Bill Stack's excellent Tutorials. We already know that the autopilot is capable of piloting the aircraft, so fly the entire flight without the autopilot or flight director. The chances are that you found the take-off, cruise and descent were manageable, if a little inaccurate and untidy; there was plenty of runway and sky to move around in. The hardest part doubtless began when you started flying your approach down the ILS. Both speed and altitude can become difficult to control with the plane seeming to have a mind of its own. If you struggled with this, you may have become distracted and lost your heading too, with the situation rapidly getting out of control. This instability can easily happen whether you are flying an instrument or a visual approach. If you want a further test, try flying some visual circuits, aspiring airline pilots have to do this - it's easier said than done.

Before you begin, if you are going to fly heavy jets using Microsoft Flight Simulator, you need to do something about the unrealistic pitch oscillations which can plague your control. To solve this, turn down the control sensitivity in pitch. This is not as easy as it may seem because you will need to retain enough pitch authority to rotate for take off, but remember that airliners do have a comparatively sluggish response to their controls. If you have Flight Simulator 2000 Pro, you can dramatically improve things using the programme FSEdit.exe that comes with the simulator. Create duplicate planes, look at their flight dynamics and set their pitch stability to two, which is their maximum setting. Abacus also has a Flight Dynamics Editor utility on its web site (www.abacuspub.com) that can adjust many properties of Flight Simulator 2000 aircraft. This tweaking of the plane's response alone should increase the flyability of your fleet.

Controlling up to 300 tonnes will require all your concentration

Accurate Speed and Pitch

The first stage of any flight is the take off and it is achieved quite simply by applying full power, waiting for a good flying speed to be attained and then rotating to give a good rate of climb. The first thing you should bear in mind when accelerating down the runway is that your engines will have a number of maximum settings that must never be exceeded. This may be obvious from the specific engine dials, or it may be something you have to learn. Typically the maximum power will be dictated by the need to keep the turbine N1 below 100 plus a few percent. There are also a number of 'V' speeds that are vital to the take off.

The take off decision speed, V1, is the speed above which you should continue with the take off, even if there is a problem. It is calculated in a number of different ways, but is effectively the speed at which the same amount of runway will be used taking off as would be used stopping again. Below V1, less runway is used stopping and hence if there is a problem you should stop immediately. Above V1, less runway is used by taking off and so that is what should be done.

VR is the speed at which rotation is commenced. At VR the yoke or joystick should be eased gently back to rotate the aircraft to its take-off attitude and hold it there. This attitude is typically about 12° pitch up. Rotating too far will not improve your take off and in many airliners will result in the rear of the fuselage striking the ground.

Once properly airborne and established in your initial climb, the pitch should be adjusted to give an indicated airspeed of V2, the take off minimum safety speed. This is the speed that will give the best rate of climb in the event of an engine failure.

If you follow these rules you will achieve the best initial climb performance for the aircraft. Taking off at either higher or lower speeds will result in poorer climbs. Therefore you should stick to the V1, VR, V2 speeds precisely for every take-off. Unfortunately, although these speeds are sometimes published in flight simulators, they are usually published as fixed speeds. This is not the true situation because the speeds may actually vary considerably. The problem is that an airliner's weight can almost double when it is full of passengers and fuel. This is one of the fundamental differences between airliners and smaller aircraft. By comparison, the change in weight for a Cessna 172 will be about 15% to 20% and what's more the Cessna wing is relatively lightly loaded too. Different aircraft weights require different amounts of lift from the wings and this results in different flying and stalling speeds. Consequently the huge variation in airliner weight means that there is a considerable variation in their relevant speeds such as take-off, climb, approach and landing. The density of the air further complicates the situation; hence altitude and temperature also need consideration.

Climbing Out

As you climb you will need a vertical speed that is at least 500 feet per minute, because it is the minimum climb rate required by air traffic control. This will not be a problem for most of the planes you fly, as you will be able to climb significantly faster than this. However if you choose to fly a fully loaded cargo plane, you may find that your concentration has to be absolute to achieve this safely. Also, as you fly higher, your best rate of climb will reduce. The thing that is important is to maintain the correct airspeed, if you lose concentration you may lose airspeed, which can be difficult to regain. If you are unable to climb sufficiently quickly, you should level out until you have burnt off sufficient fuel to climb to a higher level.

Hand flying the PIC 767 level requires about 5 degrees nose up

By comparison level flight in the 737 requires about 2 degrees nose up. Get to know a few common pitch settings for your airliners

During climbs in a light aircraft, the most common technique is to monitor the airspeed and move the joystick gently backwards and forwards to keep the speed pretty constant. Hence you pull back to reduce the speed and push forwards to increase it. You will be doubtless subconsciously monitoring the pitch, but it feels like you are controlling the speed with the joystick. The huge weight and inertia of heavy jets mean that you will find controlling them in this way quite hard. The time delay between your actions and the change in performance of the plane is too slow. The way to control an airliner is to set the pitch on the AI (attitude indicator or artificial horizon) and wait a little to see what the effect is. If it is not what you wanted, alter the pitch in a logical way and wait again. Most of the time your pitch adjustment should be only one degree or less, but it will depend on how fast things are going wrong. If you are starting to lose too much speed (which means any speed loss below your target speed), make bigger adjustments and make them quickly, but smoothly.

Levelling Off and Cruising

Anticipate the approach to your cruising altitude and gently start to level off before you get there. The best way to achieve this in any plane it to use the altitude left to go as a guide for your indicated rate of climb. So if you are climbing to 25,000 feet at 1,500 feet per minute, start to level off at 23,500 feet when you have 1,500 feet remaining. Keep gently levelling off so that at 24,000 feet your rate of climb is 1000 feet per minute. Similarly at 24,500 feet your rate of climb should be 500 fpm and at 24,800 feet, 200 fpm. This is almost guaranteed to give you a smooth transition from any climb or descent into level flight. Once level you will find the philosophy of flying the plane at a fixed pitch on the AI works well, and conversely flying without doing this is difficult. Many airliners fly with the nose a few degrees above the horizontal in the cruise, so get to know the best attitude for your airliner and level off to that initially, then make small adjustments to get perfection.

If you are flying a plane with a barber's pole on the airspeed indicator, you may have noticed that it moved only a little during the early part of the climb. However, once you reached a certain altitude, the barber's pole speed steadily reduced until it became a seriously limiting cap on your cruising speed. This is because every conventional airliner has a limiting airspeed and a limiting Mach number (typically 0.7 to 0.9). At lower altitudes the airspeed is the limit, and this is why the barbers pole is relatively stationary. However at higher altitudes, as the speed of sound decreases, Mach number becomes the dominant constraint. At high altitudes, flying too fast will give you high speed buffet as the airflows across the plane reach the speed of sound. If this buffet is ignored the plane can become dangerously uncontrollable. Conversely, if you fly too slowly you will experience low speed (pre-stall) buffet, which if ignored can lead to loss of control, again with dire consequences. The unfortunate fact is that pre-stall buffet and high speed buffet are easily confused. On older, less sophisticated planes, this left the pilot in a quandary whether to increase or decrease speed and knowing that the wrong decision could have very nasty consequences. For this reason the flight condition at these high limiting altitudes for a plane is known as 'coffin corner', so it is sensible to keep well away from this part of the flight envelope!

Once you are established and stable in a cruise, you will need to monitor pitch continually. As fuel is used the plane will become significantly lighter. This in turn means that less lift is required and the pitch angle for steady flight will reduce. You will also need to maintain the aircraft's pitch in any turbulence and as passengers move around the cabin. Although it has not been mentioned yet, in every stage of any normal flight in any plane, you should strive to be fully trimmed for hands-off flight. This is a 'given' for any flying you do. Unfortunately, effective simulation of trimming is hard to find and it may be impossible to get your trimming exactly right.

Planning your fuel will make touchdowns easier, otherwise you may be overweight on landing

The final point to bear in mind during your cruise is the procedure following a rapid depressurisation of the aircraft. Should the aircraft cabin pressurisation fail at any time the plane is above 10,000 feet, you will need to descend to that height as quickly as possible. The normal procedure is to apply full air brakes or spoilers, reduce the engines to idle thrust and point the nose as far down as possible without exceeding your maximum speed. Some companies advocate lowering the undercarriage to give even more drag, however this normally requires delaying the descent until the speed has reduced below the limiting speed for undercarriage extension. What is important is losing height in the minimum time and in most circumstances it is more effective to start the descent without any delay. So, unless you are already at an acceptable speed for gear extension, it's best to leave your wheels up and immediately head downwards.

Normal Descent for Landing

The ideal descent from a high altitude cruise is a glide, which finishes at the start of the ILS approach, although the chance of this happening in today's busy skies is minimal. Not only will you need to level off briefly at FL100 (10,000 feet) to reduce your airspeed below 250 knots, but air traffic is likely to either bring you down early or not clear your descent until you are past your optimum top of descent point. You may also need to follow an arrival procedure that requires you to fly at less than ideal altitudes along the way. Nevertheless, the most common and popular rule of thumb is to begin your descent when you have about three miles per thousand feet altitude to go. So at 30,000 feet (or FL300) you would start your descent when you have about 90 miles remaining to your destination. You should monitor this on the way down so that at FL250 you have 75 miles to run. If you find that you are not at the height you should be, correct this with small changes of thrust and pitch, or be prepared to add a little spoiler if too high. Again, the most accurate way to control the plane during a hand-flown descent is to hold the plane at your selected pitch on the AI, wait and readjust the pitch if necessary.

Approach Speeds

The real fun starts as you approach the airfield, when that variable plane weight mentioned earlier starts to play its tricks. Because of the huge variation in aircraft weight, and consequently stall speed, there is an equally large range in approach speeds. The way this is accommodated is to specify a reference speed called Vref for each possible arrival weight of the aircraft. This is the final approach speed and everything is set relative to this. So if Vref is 140 knots and the final stage of flaps is at Vref+20, the flaps will be set at 160 knots, but on another flight, where the plane is heavier and Vref is 150 knots, the flaps would be put down at 170 knots. This is an important point because if you do not allow for the changes in Vref, your approaches are likely to be flown at the wrong speed. Also, it is essential to hold your speed steady, because varying speed means varying lift and the consequent difficulty holding the correct glidepath. Most operators supply their pilots with cards showing the relevant speeds and some high quality simulation software also shows this information either on cards or as bugs on the airspeed indicator. If you don't have these cards, you can determine your own Vref for a variety of weights, or fuel loads, as it is 1.3 times this stalling speed with all the flaps and gear down for landing. You could then use this information to make Take Off and Landing Data Cards for the planes you fly regularly, although you may find that the simulated stall speeds don't vary as much as they should. Remember that most flights are planned to land with the minimum safe fuel load and if you regularly fly short flights with full tanks, you are probably trying to land the plane overweight, which won't help.

Knowing the landing speed is one thing, holding it is another. The problem is that many airliners fly the approach on the 'wrong side of the drag curve'. This takes us into the obligatory aerodynamics explanation and you should look at the graphs whilst reading this section. To fly at a steady speed in level flight, the thrust from the engines must equal the drag from the plane. At higher speeds, as you would expect, flying faster gives more drag and hence requires more thrust. Similarly flying slower requires less thrust. If a gust slows the plane down, there is less drag, but the thrust is unchanged, hence there is more thrust than drag and the plane speeds up again. This makes the plane's speed very stable. However, when flying on the wrong side of the drag curve, flying slower requires more thrust and flying faster requires less thrust. You'll see this from the graph. This results in instability because if the plane flies through a gust that slows it slightly, the plane will now not have sufficient thrust set to hold that speed, hence the plane will slow some more. The plane will continue to slow until the pilot adds enough thrust. Once the pilot has added enough thrust to overcome the drag, the plane will speed up, but once it has speeded up a little, the excess thrust above the drag continues to increase. The plane will therefore continue to accelerate until the pilot reduces power again. This is why it is easy to get into a speed yo-yo of alternating between way too fast and way too slow. This problem is exacerbated by the spool up times of the jet engines and the lack of propeller braking that is enjoyed, in many cases unknowingly, by pilots of propeller aircraft. It's worth re-reading this explanation if you didn't follow it first time through, as this principle is key to speed control on final approach for many airliners.

Looking good with a Vref of 140 knots, VSI showing 700fpm and PAPI indicating 2 reds and 2 whites

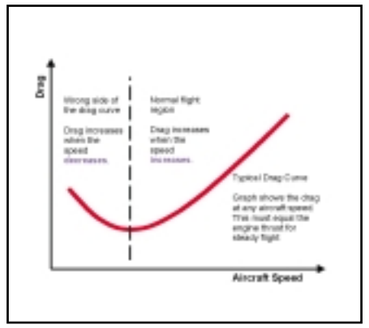

Drag
Wrong side of the drag curve
Drag increases when the speed
Normal flight region
Drag increases when the speed
Typical Drag Curve
Graph shows the drag at any aircraft speed. Will must equal the engine thrust for steady flight
Aircraft Speed

Figure 1 – Typical Drag Curve for an aeroplane. Notice the left hand side of the graph slopes downwards and the right hand side slopes upwards

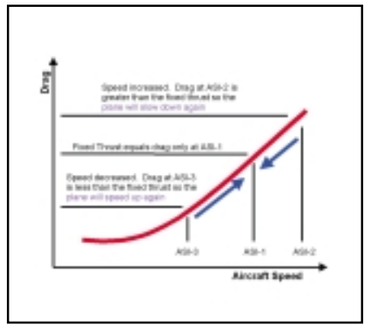

Drag
Speed increased. Drag at ASI-2 is greater than the fixed thrust so the plane will slow down again
Fixed Thrust equals drag only at ASI-1
Speed decreased. Drag at ASI-3 is less than the fixed thrust so the plane will speed up again
ASI-3
ASI-1
ASI-2
Aircraft Speed

Figure 2 – Flight in Normal Flight Region. This shows how the speed is stabilised at ASI-1

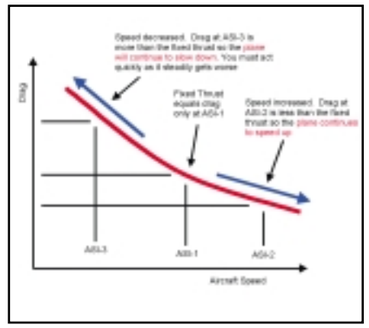

Drag
Speed decreased. Drag at ASI-3 is more than the fixed thrust so the plane will continue to slow down. You must act quickly as it steadily gets worse
Fixed Thrust equals drag only at ASI-1
Speed increased. Drag at ASI-2 is less than the fixed thrust so the plane continues to speed up
ASI-3
ASI-1
ASI-2
Aircraft Speed

Figure 3 – Flight on the wrong side of the drag curve. This shows how the speed will always move away from your initial speed if there is the slightest change in aircraft speed

Once you know why the speed is difficult to control, you can do something about it. Firstly, get to know the approximate engine setting you are going to need for the steady approach speed, in this example the setting will be 60% N1. You will normally be slowing down, so as soon as the plane slows to this speed, set N1 to 60%. Now if the plane slows down, adding a little power probably won't help much, because it may not be enough to overcome the drag when you are on the wrong side of that drag curve. You must be bold and add a lot of power to give say 75% N1, and the plane will start to accelerate again. Now for the clever bit. You know that 60% was not quite enough power to hold your approach speed, but 61% may be. So as the speed increases back to your approach speed, reduce the power to exactly 61% N1. This can be difficult to achieve too, so move the throttle lever back to roughly where it was in the first place when you had 60% N1, and then make a small adjustment. If you increase speed, use the same procedure in reverse, but don't reduce power too much. It's always easier to lose speed than to gain it again! So the principle is to make big changes to your power setting to regain your approach speed. Then, once you have got back to your approach speed, reset approach power, or something very close to it.

Approach Control

It is important to recognise a distinct difference between approach speed control for light aircraft and heavy jets. On light aircraft you should control your rate of descent with the throttle and your speed with pitch via the joystick. Things are reversed for an airliner. You should control the speed with the throttle and the rate of descent with pitch. This is necessary for a host of reasons, however the main two are the inertia of the plane and the absence of propeller wash across the wind giving you different lift at different throttle settings. Of course, the two controls are interdependent to a degree, but using them in this way will make your life much easier.

As you fly down the approach, your rate of descent should be about 700 fpm, this is a good starting point and avoids the mental strain of a calculation when you need to be concentrating hard on other things. However you can work it out from your ground speed if you are not too busy. The method is to halve your ground speed and then multiply by 10, so 140 knots ground speed gives you 700 fpm.

There is one significant bear trap waiting for the unsuspecting pilot on the approach and that is wind-shear or microbursts. They are usually indicated by sudden unexpected changes in speed or rate of descent. For a sudden speed increase, allow the speed to stay high as it will probably reduce again just as rapidly. For a speed loss and sudden sink, apply full power and raise the nose, don't stall but be prepared to get pretty close to stalling if necessary. Height loss in a microburst can be extremely dangerous, so if you suspect you are entering one, don't hang about, apply full power immediately; you won't have the luxury of time.

During all your descents, especially if you are shooting an ILS, it's a good idea to repeatedly call your heights out to yourself as you descend. So if your decision height is 200 feet and you are at 1000 feet, say out loud "1000 for 200". Keep doing this until you reach 200 feet. Use this self-reminder more frequently as you get close to your target altitude. You can use it when climbing or descending in any stage of your flight. Do this every time and you will never 'bust' an altitude level again.

Once you are a few feet above the runway, gently ease back on the joystick to arrest the sink, and hold it there, allowing the plane to settle onto the runway. Do not try to hold the plane off the runway as you would for a light plane, you only want to slow the descent. Holding the plane off can easily result in over rotation with the inevitable grounding of the tail on the runway. When landing light single aircraft, the very last part of the approach is often flown using the wing down technique, effectively side slipping the last few feet onto the ground. This is not possible on most large jets because the engines or wingtips would hit the ground, so keep your wings level at this critical stage.

Putting it all together

There are a few differences between airliners and light aircraft, but otherwise flying an airliner is the same as flying a small plane. It is more challenging however, because the errors that you make are harder to correct and the consequences are amplified. Much of the art of flying the larger jets is purely associated with accurate flying, in particular instrument flying. What's more, if you use your skills honed on airliners when flying light aircraft, you will find that they become easier to fly too.

Learn the pitch and power settings for a number of common situations, that way you can quickly get close to the required flight condition and then adjust to get exactly what you want. Remember that the pitch and power required in a turn is different to that associated level flight at the same speed, if you know these too, you will find the tendency to wander from your altitude is significantly reduced.

Armed with the techniques given in this article, you should find that controlling an airliner by hand is not too much harder than any other plane. There are many circumstances where you must fly by hand, such as some of the more demanding approaches or when circling to land, so to be a complete pilot you must be a master of the skill. It's very tempting to use the autopilot extensively when flying airliners, and in many cases it makes sense, but the more you fly with it switched off, the better pilot you will be and the more fun you will have. So, for a while, try flying exclusively by hand most of the time. Soon you will find that you only use the autopilot when you want to, and not because you need to, which has to be the most enjoyable way to fly. ■

Stephen Heyworth

It's good fun, but is it any use?

PC Flight Simulators and the Student PPL (Private Pilot's Licence)

Attending the Royal Aero Club Trust Conference that discussed how to get young people more interested in aviation got us thinking about the value of flight simulation for learning about real aviation, whether for the young or not so young. We sent our man on the tarmac, Christopher Jarman out to have a chat at his local flying club and see if a 1GHz Compaq is as much use a real Cessna for anyone that wants to learn to fly.

I suspect that most flying schools have a computer with an old Flight Simulator on it somewhere around the back of the classrooms. It is most likely to be an early version of a Microsoft simulator, as few flying schools are renowned for spending money on extras. I have seen pilots, students and instructors entertaining themselves on a laptop simulator on a wet afternoon in the bar when there is no real flying to be had. But the question remains, are simulators any real use to a student PPL? If we're talking laptop with only a finger pad or keyboard, then the consensus is that this will prove of little help to a new student.

When I trained for my licence four years ago, I was already a flight simulator enthusiast. I naturally assumed that while I was learning to fly the Piper Tomahawk at Thruxton for real, it would be a good idea to rehearse it all at home on my copy of Flight Simulator 95. In particular, I was delighted that I had a pretty realistic chunk of local scenery. When I mentioned this to my first instructor I was truly surprised when he stroked his chin, hummed and appeared less than enthusiastic. Slightly embarrassed I dropped the subject. My third instructor, though, was quite a keen simulator enthusiast himself. He was all in favour of my practising on a simulator and he actually gave me a copy of the simulator he favoured, which was called IFT Pro V. It had no scenery and was just for practice with instruments. I should have taken notice of this massive clue at the time, but somehow the penny didn't drop.

Cessna Tail dragger with the tower behind (Tower View?)

I continued my training, which in England meant that it went on very irregularly due to our island weather system. I also seemed to keep on being assigned to those instructors who were applying for jobs with airlines. Each one disappeared after two or three sessions to buy gold striped shoulder pads. I didn't mind this too much. Although it meant every new mentor started from the beginning again, I found I got different benefits from them all. After being passed round from hand to hand in this way I staggered solo into the skies after an average score of 14 hours. I gather that during World War One I would have had about the same amount of logbook time before whizzing out to France and facing the Red Baron, so I felt extremely lucky that I was in a Piper 38 and not a Sopwith Camel, I can tell you!

To gain a PPL in the UK today takes about 45 hours of flying and some nine or ten examinations or tests, which are not too difficult, but do need a bit of reading and classroom work. Don't fret about this as there are no trick questions and the tests consist of ticking multiple-choice answers. The total cost varies a bit from school to school but is about £4,500 including textbooks, charts and so on. This may well be spread over a couple of years depending on the weather. You could say it is really no more expensive than some people might spend on their family holidays over two seasons, or the cost of a second-hand car. If you were wondering whether practising on a PC flight simulator would save you money; it is safe to say no it won't (well, not yet, anyway). Whatever extra help a simulator may provide, it will not shorten your course.

What struck me very forcibly was that real flying was nothing like the simulator. For a start it was slightly easier and the controls were firmer and more responsive than any computer joystick. But most important was that being immersed in the real 3D, or perhaps 4D, world was a totally different experience. 'As real as it gets' is even at best, not at all authentic in my experience. During a genuine flight, if you find yourself accidentally whipping through a bit of unexpected cloud, or perhaps your attention wanders and you make a turn just a little too steep, you can experience a real frisson of alarm. Sudden unexpected and violent turbulence can happen at any time and this can send your heart rate up like a machine gun. Unless you are too sensitive even to be considering a PPL, this is unlikely to happen to you while flight simming!

On the computer, your focus is of necessity riveted to the screen in front of your nose. In the real wide blue yonder, as a pilot, you simply must look all around you, to either side and behind. When you turn left you should look to the right quickly before you proceed and vice versa. You must keep your neck almost on a stalk and look ahead of your turn as you go round. You are not encouraged do this using a computer screen – well not on an ordinary domestic PC anyway. All those different viewpoints in the simulator, however sophisticated, are gained by flicking a top hat button or pressing the number pad - not at all the same thing. Try that with your top button on the yoke in your local Cessna 152 and you will be radioing your intimate chat to the world at large. So you can understand why many instructors consider that, from the seat of pants VFR-flying point of view, a simulator could easily get you into bad habits. Long practice at the computer could even be dangerous if it made you think that you were experiencing all the skills necessary to become a pilot. Keeping a good lookout is such a basic piece of airmanship that flying while always facing only to the front could be an extremely bad tendency.

It is not a good idea to advocate a general policy merely from one's own experience. So I have been asking around among some flying instructors and PPLs in order to gain the big picture. This is not easy either, because people use flight simulators in such different ways. Personally, I like to meander about in a haphazard manner in a small single prop aircraft at around 1,500 feet and try buzzing Mount Everest or the Norwegian Fjords, or practising circuits at my own local airfield. I sometimes make a little journey across country to reproduce a real flight I have made. Landing on a clear space on the top of Mount Ranier in Washington State is my latest bit of fun. It's great entertainment using the latest scenery add-on in Fly! but not at all representative of a PPL's activities. To my amazement I find that this sort of thing is considered anathema to many flight simulator enthusiasts. They want to accurately mimic a 747 captain and take everything very seriously. Some of us may join a virtual airline and plan in great detail trips at 35,000 feet from Heathrow to Sydney. Each to his own, but tell your new instructor that you're a proficient 747 captain (on your PC) and he may refuse to take you up!

Bearing this in mind, it becomes very difficult to advocate using a flight simulator as part of PPL training, unless we have some idea of what the simulated curriculum should be and how precisely the simulator might be used.

The author by the Italian two-seater Sky Arrow. A fun plane!

The bar at Old Sarum Flying Club near Salisbury. Students get free coffee!

Piper Tomahawk panel from an FS 2000 add-on

Real life Tomahawk panel from Thruxton Weston Air Flying School

A WWII memorial at Old Sarum, the second oldest military airfield in the UK

THE VIEW FROM LANDS END

Kevin Parkyn conducted a quick 'straw poll' for us around Lands End Aero Club and let some of the club members, instructors and students have a look at a decent PC setup. The results were interesting.

CFI (Certified Flying Instructor) comments, based on Flight Simulator 2000

"Very useful indeed for procedural training (approaches etc) and for instrument practice."

The CFI was concerned that students will mentally 'pause' the aircraft when faced with a crisis!

A comment from several members was that a lack of peripheral vision on a PC screen is the major handicap to the realism. A military pilot converting to a PPL also echoed this comment.

Regular flying members fell into two distinct camps: Those who were impressed by the graphics, and once they found that the local area was detailed correctly they thought it may be useful to help familiarise themselves with other airfields and recognise their layout from the air. This was on the proviso that they could trust the scenery textures. The UK2000 scenery pretty well matched Pooleys on the ones we tried.

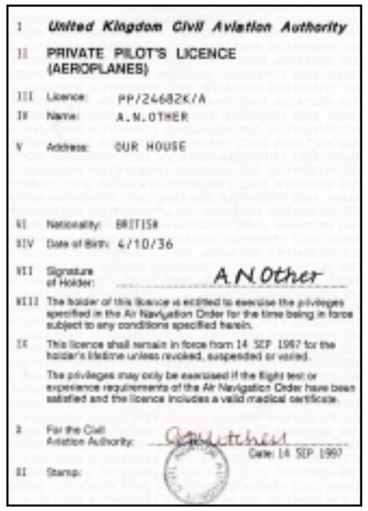
The others, diehard anti-simmers of course, dismissed it as a 'toy' and no constructive comments were available from them. The most open minded were the students, many of whom had used FS95/98/2000 before coming to the club to learn to fly.

The CFI acknowledged that these programs may well have influenced potential students to try their hand at 'the real thing' but added that there was also a lot of un-learning to do. (She has had students who could navigate cross country, on instruments in the simulator, yet did not appreciate the correct landing technique (roundout, flare etc) in a real aeroplane, neither did they appreciate the significant g effects of heaving on the controls as though it were a PC joystick. There is a very long way to go with force feedback before that will be overcome!

The general opinion is that rudder pedals help, particularly to keep students 'Thinking Rudder'. Rotary pilots admitted that that the handling was pretty good and did a lot to keep their brains in 'Rotary' mode with regard to wind etc, and they made similar comments on rudder. For helicopters a simulator is useless without rudder pedals and it is virtually impossible to get the sensitivities right.

It does seem, at present, that the specification of the equipment required would make a PC simulator in a flying club like ours (150 members, 149 of us have no cash) prohibitively expensive. The problems, I feel, is the image of the present simulations as "not serious", although the Jeppesen/Microsoft link adds a lot of credibility.

Funnily enough, the biggest draw was an old copy of Warbirds, on which people completely disregarded the graphics and consistently praised the stall and spin characteristics of the aircraft (or rather the recovery from unusual attitudes) as remarkably realistic.



I United Kingdom Civil Aviation Authority

II PRIVATE PILOT'S LICENCE (AEROPLANES)

III Licence: PP/24682K/A

IV Name: A.N.OTHER

V Address: OUR HOUSE

VI Nationality: BRITISH

VII Date of Birth: 4/10/36

VIII Signature of Holder: A N Other

The holder of this licence is entitled to exercise the privileges specified in the Air Navigation Order for the time being in force subject to any conditions specified herein.

IX This licence shall remain in force from 14 SEP 1967 for the holder's lifetime unless revoked, suspended or varied.

The privileges may only be exercised if the flight test or experience requirements of the Air Navigation Order have been satisfied and the licence includes a valid medical certificate.

X For the Civil Aviation Authority: Date: 14 SEP 1967

XI Stamp:

Copy of a typical Private Pilot's Licence issued by the CAA. That coveted piece of paper!

In speaking to some experienced instructors, it became clear that there are no straightforward views shared by all on the merit of flight simulators. Many seem surprisingly unaware of what the latest programs can offer, but you get the strong impression that it would not matter very much anyway, because PC simulators will never have enough about them to convince most qualified instructors that they could contain much of real value. One put it this way:

"If you buy the 'Full Monty' of yoke, separate throttle, and rudder pedals with toe brakes designed for flight simulators not racing cars, you could possibly benefit from practising your radio nav skills. On the other hand, one problem is that a real aircraft panel is much wider than even a 21 inch screen, so that you still can't practice scanning the instruments properly."

Since the introduction of the European JAR regulations a couple of years ago, radio navigation has, for the first time in the UK, become part of the PPL syllabus. This is a very good thing, as now a newly qualified pilot caught out in hazy conditions should at least be able to find out where he or she is. Then the pilot is able to set a course for the nearest airfield with an approach beacon. This can be very reassuring. When I trained years ago as a Fleet Air Arm Observer we were taught never to use radio aids in case the enemy picked up our transmissions or those of our carrier thus giving our position away. This led to all kinds of ego-boosting claims for the accuracy of dead reckoning. Observers would quote the maxim "I've never been lost in my life, although I was uncertain of my position for three days once".

Bob, a regular user of Flight Simulator 2000, who is gearing up to start a PPL course soon, says that his training on the PC may have helped him to steer a compass course better and to keep a steady altitude. He believes too that lining up with the runway on the PC and landing will also be of help when it comes to the real thing. But most instructors would doubt that. Bob himself concedes that the lack of a 'fright' factor make most of these experiences too 'sanitised' to be truly helpful.

Some instructors will agree that setting up some VOR trips and approach patterns on a computer could be quite beneficial for

The cockpit of the ever popular P-28. You'll need a 60-inch monitor to repeat this at home

this particular part of the course. We have also spoken to a qualified PPL who would certainly support this view and uses Flight Simulator 2000 as a practice system just for radio navigation alone.

But let's get back to the 'seat of the pants' effect again. One of the principles of IMC instrument flying is that you must learn to trust your instruments and not be misguided by other input, especially visual or gravitational sensations. One instructor pointed out that although the PC instruments may look quite realistic, there is none of that weird input that you get from being airborne. Thus there is no challenge to your senses that you need to fight and to overcome. It's too simple in other words. Of course, in the huge expensive simulators that airline captains convert with and practice on, these sorts of sensations are fed in. They try to provide a holistic experience. While it is difficult for an ordinary member of the public to get time on one of these, it is not impossible. For example, there are flight centres such as Bournemouth where you can buy time on their small civil simulator at about £30 an hour. Also, there is The Yorkshire Flight Centre at Ferrensby near Knaresborough. There you can have 20 minutes in a full-sized Boeing 737 series 200 simulator for £125, or for ten pounds more you can frighten yourself silly in an F-4 Phantom simulator.

To sum up then, it appears that the usual type of PC flight simulator will probably not help the beginner who is just starting a PPL and who has not yet learned to fly. It may even lead to bad habits such as being fixated on the view ahead and in any case will not save you either time or money. Nevertheless, as your training progresses past your first solo and into radio navigation, use of VOR and beacons, a flight simulator with all the realistic accessories may be of help but then only if your instructor approves. If you can fix up a rocking seat and a 60-inch screen so much the better. The hard-core enthusiasts among our readers may not like this conclusion, but as my wife keeps telling me when it's time for supper, "It's only a game dear!" Needless to say it's one area where I disagree with 'She who must be obeyed'. ■

Christopher Jarman

WHAT DOES THE PANEL SAY?

PC Pilot is lucky to have a number of writers and contacts that are qualified pilots, so we asked a couple of them these two questions:

Do you think that being a good flight simulator pilot can help if you want to go on and take a PPL?

Or is it that PC simulators teach too many bad habits and are best avoided if you want to become a proper pilot?

Greg Gott, our Hardware Editor and a pilot for over a decade said: "Emphatically YES! The degree of realism is such these days that many piloting skills can be learned and understood through the use of PC flight simulators. (I certainly wish simulators had been available when I was training)."

"Remember the two 16 year olds that stole a plane, took off, made two successful landings at distant airports before being caught? Between the two of them they had zero pilot-in-command time and never had a formal lesson. Most of what they knew they learned on a PC. Considering they did no damage to the airplane or themselves, I'd say very few bad habits were learned!"

Joe Lavery passed his PPL in 1996 and told us:

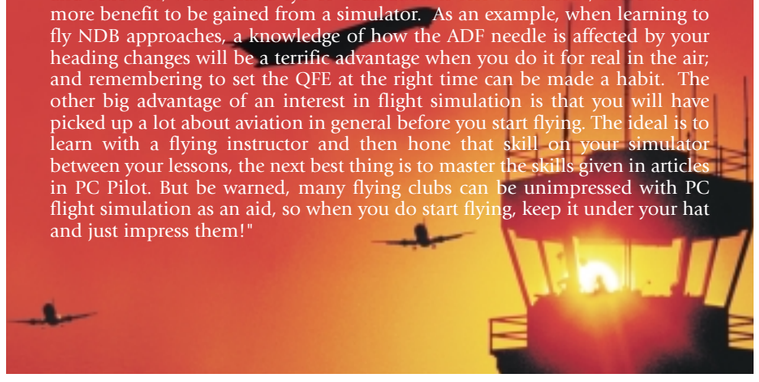
I always wanted to fly and I suppose flight simulators in general were helpful in keeping that dream alive. As far as flight simulators helping someone who wants to do a PPL, they will certainly help with the mechanics of flying but the reality and feedback you get in a real plane is impossible to simulate without a rather expensive piece of kit. I don't think they create bad habits though, because any decent instructor will insist on a fairly strict regime inside the cockpit.

I know from personal experience that flight simulators are excellent for teaching instrument flying. My own instructor who is now a commercial pilot with BA spent many hours in my home teaching me NDB holds and VOR approaches, something that can be prohibitively expensive to do in the air. I also think that once you become a pilot your flight simulator flying is done with much greater precision. In other words you don't crash so often!"

Stephen Heyworth, who writes many of our features about real flying, answered thus:

"If you approach your flight simulator flying seriously it can be a great benefit to you when aiming for a PPL. However, to get the benefit from it you must fly small aircraft on your simulator pretty much all the time and fly them properly, which involves learning how it should be done, working with real aviation maps, flying 100% visual, never setting the visibility more than 10 miles, leaving the autopilot off, not using radio beacons for navigation, always having some wind set, planning your flights properly before you fly and generally approaching it as if it were the real thing. If you don't do it properly, you may not gain much, but equally it won't do any real harm.

"Unfortunately the controls and the feel currently differ between simulators and aircraft, hence simulators probably won't be too much help learning to handle the aircraft especially at touchdown, but this is actually a minor part of learning to fly. Where simulators excel is in getting the navigation and procedural elements right, and being able to fly exercises again and again without being charged £100 per hour. When you move on to further ratings and renewals, where hand-eye co-ordination is less of an issue, there is even more benefit to be gained from a simulator. As an example, when learning to fly NDB approaches, a knowledge of how the ADF needle is affected by your heading changes will be a terrific advantage when you do it for real in the air; and remembering to set the QFE at the right time can be made a habit. The other big advantage of an interest in flight simulation is that you will have picked up a lot about aviation in general before you start flying. The ideal is to learn with a flying instructor and then hone that skill on your simulator between your lessons, the next best thing is to master the skills given in articles in PC Pilot. But be warned, many flying clubs can be unimpressed with PC flight simulation as an aid, so when you do start flying, keep it under your hat and just impress them!"



THEY CALL THIS THE BIG ONE

An airborne Kiwi odyssey

When a member of our team was talking about a trip to New Zealand, PC Pilot reader Tony Wilson put together a challenging trip so he could familiarise himself with the country before he got there. Thanks to the wonders of flight simulation our man Mal (for it was he), was able to relax on the leopard skin chaise-longue, in his trademark fez and curly slippers, sip an iced sherbet and explore New Zealand from the luxury of his Brighton mansion. We were so impressed with the flight that we thought we'd pass it on so that our readers could enjoy a trip through this beautiful country.

You arrive in Auckland, New Zealand just past 5am after 23 hours of sitting in seat 29F since leaving Heathrow. What have you seen apart from 5,500 square feet of wing? Not much. Don't worry – that's all going to change.

You are transferred to Ardmore Airport to collect the Cessna 182S Skylane, just like the one you fly at home! Pre-flight planning goes well and before long you are walking out to the aeroplane, flight plan and other goodies in hand. The weather is pretty good, very much ISA conditions, with no low cloud and excellent visibility.

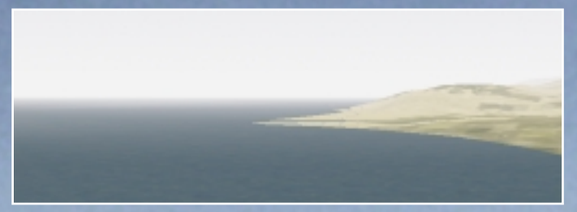
The routing here involves flying Ardmore to overhead Hamilton airport, a distance of 53 nautical miles, on to Palmerston North (146 nautical miles) and then to Wellington (71 nautical miles). You decide the speed to enter on your flight plan and local knowledge advises that 120 knots provides a plan that can be met.

Airborne from Ardmore around 9am, you hold your altitude to 1,500 feet to clear the control zone. Within five minutes, you climb to your initial cruising level of 2,500 feet and take up a heading of 140 degrees magnetic.

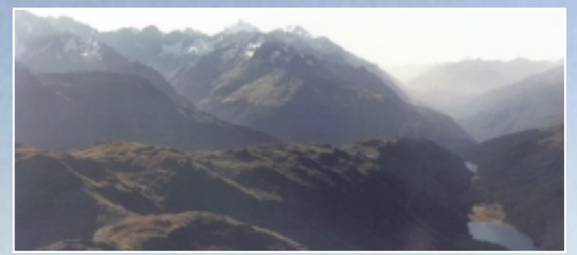
Hamilton VOR (114.0) is acquired quickly and used to correct your heading. Hamilton airport is visible from some distance out and upon crossing, you take up a heading of 160 degrees magnetic and commence climb to 8,500 feet. Palmerston North VOR (113.4) is picked up a long way out and the autopilot set to NAV.

This sector takes you very close to Mount Ruapehu, an active volcano, but fortunately the NOTAMs did not reveal any volcanic activity.

You aim to keep this volcano on your left, altering course if necessary and enjoy the view.



Clarence River Mouth, a very distinct landmark on your flight south along the Kaikoura coast



Descending into Milford Sound gives you a look at some spectacular scenery

Once past Mount Ruapehu, you can descend to 4,500 feet and continue on to Palmerston North and Wellington.

Once you are overhead at Palmerston North, take up a heading of 193 degrees magnetic.

Maintain 4,500 feet until you're around 60 miles DME Wellington VOR (112.3)

Descend to 2,500 feet with a further descent to 1,500 feet approaching Wellington Harbour. The ATIS is 126.9 and tower is 118.8. Join the left base leg for runway one six and your altitude should now be 1,000 feet.

Speed restrictions apply to both Wellington and Christchurch airports, in that a speed of not less than 90 knots must be maintained over 300 feet on approach.

No doubt you will get a "Please report to the tower" if you establish 10 finals at 60 knots.

Upon landing, clear runway to the right and taxi to the aero club (nearest tower).

Fuelled up and with a change of pilots, taxi out and hold short of runway. Set the

Mount Ruapehu rises majestically to the heavens

ADF to Cape Campbell (286). The distance to Cape Campbell is 34 nautical miles, with Christchurch being a further 130 nautical miles.

When ready, takeoff and turn right at 500 feet onto a heading of approximately 204 degrees magnetic to track the ADF. Climb to 2,500 feet.

From Cape Campbell, turn left a little and just follow the coast. Christchurch VOR is 115.3 and you can use this for distance information. Then just enjoy the view.

Clarence River Mouth, a very distinct landmark on your flight south along the Kaikoura coast.

Christchurch ATIS is 127.2 and the Tower is one 118.3. When you are 20 miles DME Christchurch, you should be down to 1,000. About 12 miles DME, you will cross a river.

When you cross the southern most portion of its waters, take up a heading of 216 degrees magnetic. You should be able to see the airport at this point.

Aim about one mile to the left of it and put yourself on left base. You will be landing on runway 20. You can use the main runway if you wish, but we challenge you to use the short (515m) grass runway to the right. Take on fuel and pilots if required, also a late lunch.

Takeoff on runway 20 grass and at 600 feet, turn right onto a heading of 290 degrees magnetic and maintain 1,000 feet for about three minutes. Now clear of Christchurch, turn on to a heading of 226 degrees magnetic and climb to 6,500 feet. Set the VOR for Mount Mary (112.5). This is 105 from Christchurch, so it may not show up initially. Queenstown is a further 88 nautical miles. On crossing Mount Mary, set the VOR to Slope Hill (113.6).

As the DME indicates closer to Slope Hill, you will see a valley, perhaps just slightly left of track. This is the Cadrona Valley and culminates with a saddle very close to Queenstown.

Queenstown Tower is 118.1. There is no ATIS.

With the airport in sight, continue descent, (with right hand orbits if necessary) and land on runway 23. Your next stop, Milford Sound is just 41 nautical miles from Queenstown, but requires a high climb. Take-off on runway 23, maintaining heading until lake turns, where you turn to follow it. Upon reaching end of lake, turn onto heading of 285 degrees magnetic and level at 9,500 feet. About twenty minutes after takeoff, you will sight Milford Sound, with the airfield visible. Once you see it, commence descending to 3,000 feet and overfly the field, continuing to the mouth of the sound.

Milford Flight Service is 118.2 and several orbits may be necessary to lose the right amount of altitude. Upon reaching 3,000 feet, continue back to the head of the sound, descending further to 1,500 feet. You will land on runway 11. After a look around, you depart again and you may use runway 29 for departure.

Milford Sound is somewhat reminiscent of Innsbruck, in that high terrain off either end prevents straight-in approaches. After take-off, a slight turn to the right is necessary. You continue climbing out the sound to an altitude of not less than 3,000 feet before turning back to Queenstown.

The altitude that you will climb to on this sector is 8,500 feet. Essentially you are just flying the reciprocal course to your outbound flight. Once over the lake, continue descent to 2,500 feet for a landing on runway 05.

Another day and suddenly you realise that your holiday is slipping away. Today we are flying from Queenstown to Nelson and onto Ardmore. The distance to Nelson is 293 nautical miles. After take-off on runway 05, climb on runway heading. As terrain permits, turn onto a heading of 019 degrees magnetic and continue climb to 9,500 feet. Lakes Wanaka and Hawea will pass off to your left as you climb.

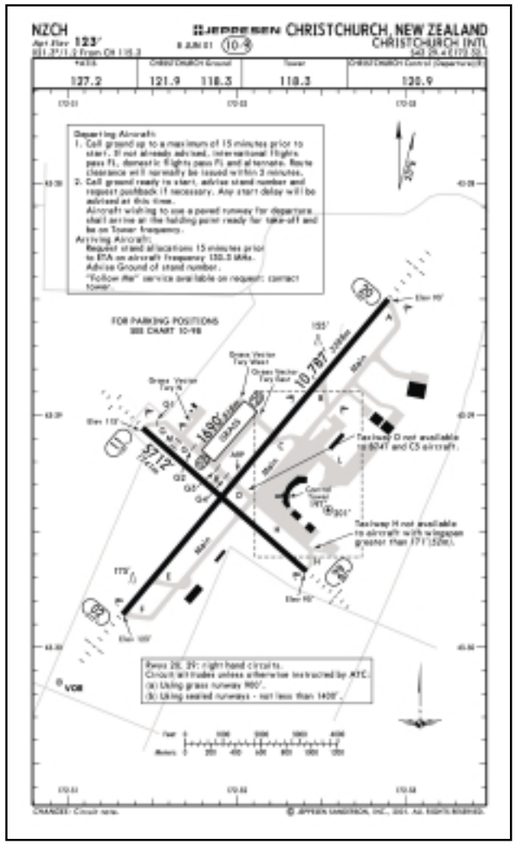
Maintain the Queenstown VOR for its DME until about 130 miles away. At this point you can select Nelson VOR on 116.4 for further guidance. Start your initial descent to 7,500 feet about 70 miles DME. The ATIS is 129.1 and the Tower is 127.4. Continue your descent as you close on Nelson and land on runway 02. Nelson is a good place for lunch, but nothing too heavy as your next two sectors are predominantly over water.

Once airborne again, take up a heading of 356 magnetic and select New Plymouth 114.4 and track in nav mode. Climb to 9,500 feet. New Plymouth is 144 nautical miles from Nelson, with a further 124 nautical miles to Ardmore. Shortly after landfall, you pass over the extinct volcano Mount Egmont (Taranaki). Change to heading mode before crossing the VOR and select Auckland (114.8). Continue tracking Auckland in nav mode.

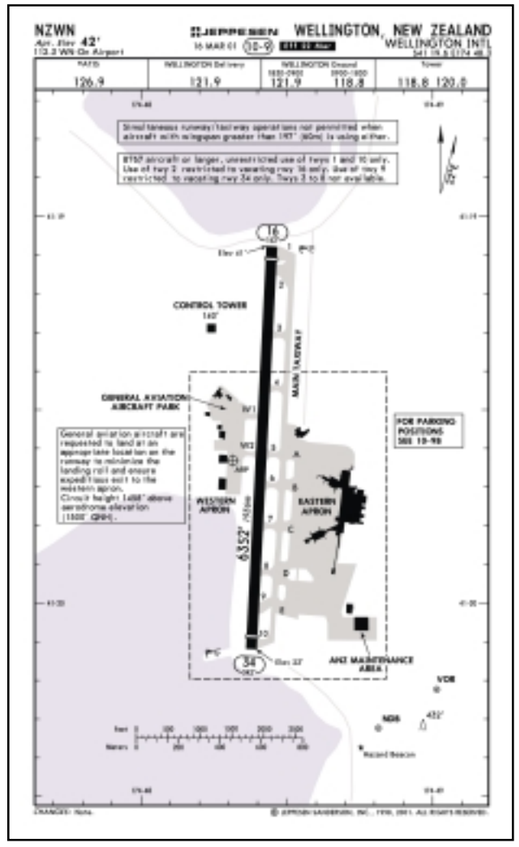
Commence your descent at 70 miles DME aiming to be not above 4,500 feet by 35 miles DME and 2,500 feet by 25 miles DME. After crossing a small city at 18 miles DME, descend further to 1,500 feet and take up a heading of 015 degrees magnetic. The Ardmore beacon will come into view at about 10 miles DME and the field itself, at 7 miles DME. Upon sighting, you are cleared to land on runway 03 or 07.

And so ends your adventure in New Zealand. Back to seat 29F and we hope you enjoyed the sights. ■

Tony Wilson


NZCH
JEPPESEN CHRISTCHURCH, NEW ZEALAND
CHRISTCHURCH INTL
TAXIS
CHRISTCHURCH Ground
Tower
CHRISTCHURCH Control (Departures)
127.2
121.9
118.3
118.3
120.9
Departing Aircraft:
1. Call ground up to a maximum of 15 minutes prior to start. If not already advised, international flights pass FL, domestic flights pass FL and alternate. Route clearance will normally be issued within 3 minutes.
2. Call ground ready to start, advise stand number and request pushback if necessary. Any start delay will be advised at this time.
Aircraft wishing to use a paved runway for departure shall arrive at the holding point ready for take-off and be on Tower frequency.
Arriving Aircraft:
Request stand allocations 15 minutes prior to ETA on aircraft frequency 130.3 MHz.
Advise Ground of stand number.
"Follow me" service available on request: contact tower.
FOR PARKING POSITIONS SEE CHART 10-9B
Taxiway D not available to B747 and C5 aircraft.
Taxiway H not available to aircraft with wingspan greater than 171' (52m).
Runs 28, 29: right hand circuits.
Circuit alt 1Hundred unless otherwise instructed by ATC.
(a) Using grass runways 900'.
(b) Using sealed runways - not less than 1400'.
VOR

Christchurch Airport


NZWN
JEPPESEN WELLINGTON, NEW ZEALAND
WELLINGTON INTL
TAXIS
WELLINGTON Del Veny
WELLINGTON Ground
Tower
126.9
121.9
121.9
118.8
118.8 120.0
Simultaneous runway / taxiway operations not permitted when aircraft with wingspan greater than 197' (60m) is using either.
B757 aircraft or larger, unrestricted use of Twys 1 and 10 only. Use of Twy 2 restricted to vacating Rwy 16 only. Use of Twy 9 restricted to vacating Rwy 34 only. Twys 3 to 8 not available.
CONTROL TOWER
MAIN TAXIWAY
GENERAL AVIATION AIRCRAFT PARK
General aviation aircraft are requested to land at an appropriate location on the runway to minimize the landing roll and ensure expeditious exit to the western apron.
Circuit height 1400' above aerodrome elevation (1800' QNH).
WESTERN APRON
EASTERN APRON
6552'
FOR PARKING POSITIONS SEE 10-9B
AMZ MAINTENANCE AREA
VOR
NDB

Wellington Airport

THE GREAT PC PILOT CLIMBING OUT COMPETITION

It could be you...!

The balmy summer breezes wafted through our attic office one Tuesday afternoon, cooling our fevered brows as we busily discussed what to do for our next competition. As if on cue, we received a phone call from one of our many aviation contacts. Would we like an old print of a Cessna 150, taking off from Biggin Hill? Naturally, we said yes and began hammering a nail in the wall. Then we heard that it was by the renowned aviation artist Kenneth McDonagh, and was called "Climbing Out". It had been part of a group of prints sold at Sotheby's 1997 aeronautica auction. We removed the nail and decided ruefully that providence had presented us with a rather good first prize. It's certainly not new and has what a dealer would describe as "a lovely patina of age" or as we might say "a bit scruffy". However, it has what they call 'provenance' and it's just the thing for the study wall or even hanging in pride of place above your PC to remind you how it should be done.

Glancing round at our shelves we also noticed that we seemed to be accumulating rather a lot of 'spare' copies of unopened flight simulation software. This is not unusual at magazines, where reviewers occasionally get sent an extra copy by a developer as well as the publisher. We thought these might make quite good runner-up prizes and so the Summer Climbing Out Competition became a reality. First prize will be the excellent Cessna print with 10 runner up prizes of flight sim software, videos, pens and other goodies.

HOW TO ENTER

All you have to do is correctly answer the following questions:

1) **Which type of engine was commonly fitted to the Cessna 150?**
   - a) Pratt & Whitney TF33 Turbofan
   - b) BSA DBD 34 Gold Star
   - c) Continental 0-200

2) **What was the name of Cessna's two-seat jet primary trainer used by the US Air Force?**
   - a) Cessna T-37
   - b) Cessna Skynight
   - c) Cessna 411

3) **What is shown by an aircraft's EGT gauge?**
   - a) Electronically Governed Temperature
   - b) External Gas Temperature
   - c) Exhaust Gas Temperature

The competition is open to PC Pilot readers from anywhere in the world with the exception of PC Pilot staff (and their friends, their friends' wives, their friends wives' tennis partners etc.)

You can send your answers by e-mail to comps@pcpilot.net or on a postcard/back of an envelope to:

Cessna Competition
PC Pilot
PO Box 11
St. Ives
PE27 3GW
United Kingdom

Please make sure you clearly state your full name, address and e-mail address (if you have one) and also what flight sims you've got. If you're lucky enough to get a runner up prize we don't want to send you something that's no good. The competition closes on 31st September 2001. Entries received after that date cannot be included and prizes will be drawn at random from correct answers.

Flight Sim Training

Professional instruction with Bill Stack

The charts used in these tutorials have been specially supplied and reproduced with kind permission of Jeppesen GmbH. These charts are NOT to be used for real-world navigation. They are for information ONLY. © 2000 Jeppesen GmbH.

BEFORE YOU START

A few prudent practices that professionals normally apply can make your flights as realistic as possible. The background will also help you enjoy flying while you learn.

OUR FLIGHTS AND AIRPORTS

Today's tutorial will take us from Blackpool Airport to Leeds Bradford. Both cities are in northern England. Blackpool is in Lancashire, right on the Irish Sea coastline and Leeds Bradford is inland, just about equidistant from the Irish and North Seas. Blackpool is a general-purpose civilian airport, while Leeds Bradford is a municipal and commercial airport with general-aviation traffic.

The major feature of today's flight will be the arrival at an airport with an elevation about 660ft (201m) higher than the origin airport. This difference mandates close attention to our altimeter setting at the destination airport for a successful landing.

OUR AIRCRAFT

Once again, we'll fly our Mooney Bravo. It's an easy aircraft to fly and it gets us to our destinations in about 25-percent less time than the Cessna 182s. In the Bravo, this 50-mile flight will take about 20 to 25 minutes. You're welcome to fly this route in another aircraft type after flying it with us in the Bravo.

THE CHARTS

Be sure to familiarise yourself with the Jeppesen charts we will use for these tutorials before embarking on this flight so you will know what to do aloft. These charts show the flight path, fixes and navigation aids. As well as the charts reproduced from the Jeppesen Sim Charts program that you'll see in this tutorial, we've included high resolution images of recent Jeppesen charts on the cover CD. For more information see page 11.

PROFESSIONAL FLIGHT PRACTICES

As usual, we steadfastly emphasize the need for following prudent aviation practices. Applying them or not can make the difference between a successful or failed flight.

USE FLIGHT PLANS

You are free to use paper plans or an electronic flight planner. Paper plans are a bit clumsy to make but easier to use aloft. Electronic plans are easy to make, but using them aloft requires following submenus that disrupt the simulation.

In lieu of filing your flight plan with ATC (air traffic control) as real pilots do, imagine that you have filed in accordance with regulations. Keep your flight plan handy throughout the flight so you can easily refer to it.

After your flight, file it in a folder or loose-leaf notebook.

NOTE THE TIME

We always jot down the time of significant events during our flights, and we recommend your doing this, too. Note the time of take off, the time of passing significant fixes and navaids, and the time of arriving at the destination airports instrument approach procedures.

COMPENSATE FOR WIND

Be sure to account for winds in your plan, because deviations from your desired course will consume additional fuel and delay your arrival. Our issue 4 tutorial explains wind compensation in detail.

MONITOR YOUR PROGRESS AND STATUS

Throughout your flight, check your instruments for the status of your aircraft and engine.

Check your position frequently, radio navaids, time/speed/heading and/or GPS. Monitor your engine-temperature, oil-pressure, fuel-flow and fuel-supply gauges. Correct as necessary to maintain desired course, altitude and performance levels. At the end of the flight, compare your estimates to the actual performance in time and fuel consumption.

SIMULATE AIR TRAFFIC CONTROL

This tutorial across northern England will take you through moderately travelled airspace to a medium-sized urban area and you will land at a controlled airport. In lieu of ATC in your sim, remember that pilots must say when they're leaving an airport's airspace, when they enter an enroute airspace and when they enter their destination airport's airspace.

FLY ONE STEP AT A TIME

While leaping over the basics and plunging into advanced flights is a great luxury of flight simulation, it is not realistic. Real pilots do not start at the end of the training course and work backwards, because it deprives them of the skills needed for meeting subsequent challenges. When flight simmers try to meet challenges for which they are unprepared, they frustrate themselves with poor performance and errors. So we strongly advise doing everything one step at a time and building your skills toward the next levels, just as real pilots do.

USE THESE TUTORIALS FOR SIMULATED FLYING

These tutorials are intended for flight-simulation, not for real-world aviation or real-world flight training. While making our tutorials as realistic as possible, we have adapted them out of necessity to the limits and nuances of flight simulation, so some aspects cannot and do not apply to real-world flight.

OUR AUTHORS

Bill Stack is an expert flight simmer and author of several popular flight sim books. Nels Anderson, our technical consultant, is a certified pilot and president of flightsim.com Learn more about flying like a real pilot from Bill Stack's flight sim books at www.topskills.com/flitsim.htm or contact TopSkills in Tennessee on 865-584-7340.

USING AIRPORTS OF DIFFERING ELEVATIONS

Using airports of differing elevations provides an important flight challenge. The elevation at Blackpool is 34ft (10m), and the elevation at Leeds Bradford is 682ft (208m). With our destination airport being 648ft (198m) higher than our origin, we could crash into the ground short of the runway or approach too high for a safe landing if our altimeter was incorrect.

To be sure the barometric pressure is different at Blackpool and Leeds Bradford, we will use different weather conditions at each airport.

Real-world pilots are confronted with this reality every day. That's why they set their altimeters at every airport they use. We haven't covered this fundamental aspect of flight in our tutorials, because we've been focusing on more interesting and challenging skills while enjoying the luxury of flight simming that enables us to ignore whatever we want until we're ready to deal with it.

REFER TO OUR PRIOR TUTORIALS

For space considerations, we will not repeat common aspects in every tutorial. If you don't have our previous tutorials, back issues are available from PC Pilot – visit www.pcpilot.net. Issues 1, 2 and 3 are now sold out, but we've re-published them in CD format, together with Tutorials 1-8. This is great value with prices from £7.99. For more details see our subscriptions page or the website.

Issue 1 Taking off, flying straight and level, flying traffic pattern, landing, simple ILS approach. London City (circuit)

Issue 2 Cross-country flight, VFR pilotage, IFR radio navigation, using SIDs, STARs, IAPs London City – London Stansted

Issue 3 Attitude flying, VFR dead reckoning, IFR NDB Approach London Stansted - Birmingham

Issue 4 Wind compensation, VFR with radio navigation, IFR VOR/DME approach Birmingham – Dublin

Issue 5 VFR scenic coastal flight, IFR fixes, holds, procedure turn, ILS approach Dublin – Glasgow

Issue 6 Night flying Glasgow – Manchester

Issue 7 Global positioning system Manchester – London Heathrow

Issue 8 Fuel calculation Heathrow – Cork

Issue 9 Flying a back course – Hanscomto New Bedford

Issue 10 LDA Approaches New Bedford to Brainard

Issue 11 Using a DME-ARC Approach – Humberside to Norwich

FLIGHT SETUP

Prepare your simulator for your flight. It takes only a few minutes, and it makes your flight more challenging, more realistic and more fun.

SET UP YOUR WEATHER

In addition to using conditions that existed when we laid out these tutorials, we will use different conditions at each airport. In mid-June 2001, the following conditions generally existed. Set your weather as shown in our weather tables. Later, you are welcome to use actual current conditions for this route.

Today's Weather Conditions

Today's Weather at Blackpool

Visibility:	10 miles
Wind:	16 knots from 280 degrees
Clouds:	Cumulus, Scattered 1/2 , Ceiling 2,500 MSL, Top 4,500 MSL
Precipitation:	None
Temperature:	53 F, 12 C
Dew Point:	42 F, 6 C
Pressure:	29.83in

Today's Weather at Leeds Bradford

Visibility:	5 miles
Wind:	18 knots from 270 degrees
Clouds:	Stratus, Broken 3/4 , Ceiling 2,000 MSL, Top 4,500 MSL
Precipitation:	None
Temperature:	51 F, 11 C
Dew Point:	37 F, 3 C
Pressure:	29.77in

You can choose whether to make this flight during daylight or night, because there is no practical difference for instrument flights. To fly at night, refer to our issue 6 tutorial for details of night flying. To make the flight a bit more interesting, try taking off before dusk or dawn so light conditions will change enroute.

PREPARE YOUR AIRCRAFT

Be sure to prepare your aircraft for flight before taking off by setting your radios and gauges and turning on your lights. The following conditions generally apply to most flights. For this flight, choose the Mooney Bravo, preferably the IFR version. All our time estimates are based on this aircraft.

Because the wind at Blackpool is 280, we will take off from runway 28. (It actually worked out this way! The day we checked Blackpool's weather, the wind was exactly 280.) Start your flight at this point. Additionally, we will calculate our fuel needs and carry enough for this trip, using the aircraft's average fuel-flow rate plus legal requirements to determine the amount of needed fuel. Remember that our Mooney Bravo uses about 16.5 gallons of fuel per hour from take off to landing. Our estimate is more than 15 and less than 20 gallons; what's yours?

SET UP YOUR AIRCRAFT

Make your aircraft ready for your flight. 'Buy' enough fuel based on your fuel calculations. Your fuel mixture should be rich, and your propeller pitch should be low at these low altitudes. The cowl flaps should be fully open while on the ground and during take off and climbout. The carburettor heat should be off, because it is not needed and its use will reduce performance when the best is needed. The Pitot heat won't be needed unless the temperatures are below freezing and there's moisture in the air. As standard procedure, set your altimeter for local barometric pressure.

Turn on the lights appropriate for this flight. Nothing is wrong with using the position lights and strobes during daylight operations, even though they are required only for night flights, except when their reflections from clouds would present a safety hazard to the pilot. Landing lights are recommended for taking off, landing and whenever flying below 10,000ft (3,050m) above mean sea level (MSL).

TUNE YOUR RADIOS

Although you can rely on your GPS for navigation, you still need your conventional radio navaids for airport operations and as a backup during the enroute portions. Set your Nav1 and Nav2 radios and your OBI for the first frequencies and radials you will use.

SET YOUR GPS

Engage your GPS by displaying it on your screen, then check the displayed course to be sure it reflects your desired flight path. Don't worry about SIDs, STARs or IAPs, because the Microsoft GPS does not reflect them. Set the map for 'north up', 'course up' or 'track up', whichever you like best.

As usual, pilots should know how to use the GPS devices in their simulators, that is, how to engage the devices, change view screens, select data and so forth. Read your sim's manual for instructions.

PREPARATION CHECKLIST

(This checklist is for these tutorials, only, and is not intended to be complete.)

Aircraft Settings

Engine:	running
Fuel supply:	adequate
Fuel mixture:	richest
Propeller pitch:	highest
Cowl flaps:	open fully
Wing flaps:	10% (specified by Mooney)
Carburetor heat:	off
Pitot heat:	as needed
Rudder:	straight
Ailerons:	neutral
Elevator trim:	neutral

Gauges

Altimeter:	local pressure
Amperes:	neutral
Vacuum:	green
Oil pressure:	green
Fuel pressure:	24 psi (specified by Mooney)

Radios

Nav1:	112.1 (Pole Hill POL)
Nav2:	not needed
ADF:	420 (Blackpool (BPL)
OBI1:	100
OBI2:	not needed
Com1:	118.4 (Blackpool Tower)

GPS

Map view:	on
Orientation:	as desired
Zoom level:	as appropriate
Plotted course:	as filed
Displayed:	as needed

Lights

Beacon:	ON
Strobe:	ON
Position (navigation):	ON
Landing:	ON
Taxi:	ON

Clock

Local time or your choice

IFR (Instrument Flight Rules) Tutorial *Part 12*

Up to the challenge - approaching a higher elevation airport

Today's trip from Blackpool to Leeds Bradford provides another new challenge – arriving at an airport of a different elevation from the origin airport. With our destination airport being about 650ft (198m) higher than our origin and with our different weather at each airport, we must be sure our altimeter is properly set and our mind is prepared to adjust for the higher elevation. The entire flight is about 50 miles and should take about 25 minutes from take-off to landing.

Blackpool to Leeds VFR

YOUR FLIGHT CHARTS

The charts for today's flight show the instrument procedures for all its portions: 1) departing Blackpool, 2) flying through the open airspace of northern England, and 3) approaching Leeds Bradford Airport. Familiarise yourself with all relevant aspects of these charts before taking off so you won't have to fumble around enroute trying to figure them out. Because some of the instrument procedure charts are not to scale, the courses depicted on them are not precisely drawn. On these charts, follow the textual directions and use the graphical depictions for comprehension only.

Because ATC guidance is unavailable to us, we will suppose the guidance we might get and rely on our instruments for supplemental guidance.

Departure

Blackpool does not provide standard instrument departure procedures for any of its runways. Therefore, we will turn left and head toward our first waypoint. Our enroute portion will begin as soon as we depart Blackpool's airspace. The track distance between our takeoff and course interception is fewer than five nautical miles.

Enroute

The enroute chart shows an airway just north of Blackpool that closely resembles the Leeds Bradford arrival procedure, both of which use Pole Hill VOR (POL). For our short, low-altitude instrument flight, we can simply fly to Pole Hill VOR then to Leeds Bradford. We can fly outbound from the Blackpool NDB, then inbound to Pole Hill VOR, then outbound from Pole Hill to Leeds Bradford. We'll also use a relatively low altitude so we won't climb for half the flight and descend for the other half. About 5,500ft ought to be ample.

Arrival

Being a commercial airport, Leeds Bradford has prescribed arrival and approach procedures. The arrival procedure using Pole Hill VOR is very handy for us. When we arrive at Pole Hill, we effectively join the Leeds Bradford arrival procedure. From there, we'll head straight to the airport.

Approach

Under the weather conditions we specified, we can land on runway 28 or 32. Runway 32 has the instrument approach, but it's 40 degrees south of the wind direction. Runway 28 is much closer to the wind direction, but it's about half the length and it has no prescribed instrument procedure. Without instrument assistance, using this runway will require a simple visual approach. We'll provide guidance for both runways and allow you to choose which runway you would like to use.

The instrument approach for 32 calls for a procedure turn off the Leeds Bradford NDB, then a standard ILS approach. We've done procedure turns and ILS approaches in prior tutorials. The profile view shows entry at 4,000ft (1,220m) above mean sea level (MSL), descent to 2,970ft (906m) MSL, then entry to the ILS at this altitude. The decision height for our Bravo, a class A aircraft, is 832ft (254m) MSL, or 170ft (52m) above ground level (AGL).

The visual approach to runway 28 would be a basic left-turn airport traffic pattern, which did in our earliest three or four tutorials. After approaching the airport from the west, we would fly parallel to runway 28 at a heading of 100, then turn left onto a base leg then left to a final approach and normal landing.

PLAN YOUR FLIGHT

Based on these charts, lay out the course you will fly from Blackpool to Leeds Bradford. Include the relevant airways, navaids, intersections and fixes shown on the charts.

Electronic Flight Planner

If you use Flight Simulator 2000's electronic flight-plan feature, you can include all needed navaids, intersections and fixes. When this feature is used, the GPS (global positioning system) window will show your course to these fixes and the destination airport. If you chose not to use it, you will need to head towards them until the fixes appear on the GPS map, then head directly to them. Or, you can revert to conventional radio navigation and forego the GPS guidance altogether. You might try the flight once with electronic flight planning and once without for the different experiences.

To use the electronic flight planner, enter the following data.

Departure: Blackpool Airport (EGNH) Runway 28

Arrival: Leeds Bradford Airport (EGNM) Runway 28 or 32 (pilot's choice)

Alternate: Sherburn-in-Elmet

Waypoint: Pole Hill VOR (POL)

Waypoint: Leeds Bradford NDB (LBA)

Altitude: 5,500ft (1,678m) MSL

Paper Charts and Flight Plans

The electronic flight planner is handy, but the old-fashioned paper charts and flight plans are still useful for seeing our course and estimated times at a glance.

PREPARE YOUR AIRCRAFT

To make your aircraft ready for this flight, use our abbreviated checklist in our 'Flight Setup' section.

TAKE OFF

Take off normally, including cockpit preparation and appropriate ATC clearances, as explained in our previous tutorials. Additionally, check your engine instruments. The Bravo's manifold pressure should be at or above 38 and the oil pressure should be at least 24. The Bravo should lift off at about 60 to 65 knots. If you use other aircraft for this flight, its performance characteristics will differ from these.

During takeoff and climbout, you will have a brisk 18-knot headwind. By a stroke of luck, it's exactly in line with our take-off heading, so it will not blow us off course until we begin our left turn toward Pole Hill. Once we're headed 100 toward Pole Hill, we'll enjoy a nice 18-knot tail wind.

Climb out at about 85 knots. During your climbout, adjust your cowl flap as necessary to keep your engine temperature in the green range - not too hot or too cool. Retract your flaps at about 90 knots. After your initial climbout, your Bravo should be able to climb easily at 700ft per minute and 120 knots.

DEPART BLACKPOOL

Without a departure procedure, we have no prescribed climb rates. So use typical procedures by climbing at 85 knots to 1,000ft (305m) AGL. With this airport's elevation being 34ft (11m) above sea level, a 1,000ft (305m) MSL altitude will be suitable. When you reach this altitude, turn left 180 degrees at a standard-rate turn and head 100 degrees toward Pole Hill VOR.

Continue climbing toward your cruising altitude of 5,500 (1,678m) MSL. In another minute or two, you will exit Blackpool's airspace.

Fly Enroute

Until you change heading for the approaches at Leeds Bradford, you will have a nice tail wind pushing you along. It will add about 20 knots to your ground speed, or you can reduce power a bit and conserve fuel while proceeding toward Leeds Bradford at the usual ground speed of about 180 knots.

Soon after leaving Blackpool and gaining sufficient altitude, you should receive the signal from Pole Hill. This VOR ought to be straight ahead or close to it, so adjust your heading as needed to head straight for this navaid.

While GPS makes navigating and plotting very easy, it also eliminates the challenges that make these flights interesting. So to avoid the likely boredom, try relying on common radio-navigation methods for maintaining your course and plotting your positions enroute. You can use the DME feature of Pole Hill VOR to help track your position enroute, or you can use the age-old time/distance/speed method.

If you are using the GPS course plotter, which shows on the map screen the courses from origin airport to the fixes to the destination airport, simply follow those course lines for each segment. If you are using GPS but not the course plotter, maintain your 100-degree heading toward Pole Hill until you see it on the GPS screen, then head straight for it.

Remember from previous flights that your engine will behave differently at various altitudes. The higher it gets, the less oxygen it will have for combustion, so you will need to adjust the fuel mixture to compensate. The engine will not perform well at all otherwise. The engine is performing best when the TIT (turbine inlet temperature) gauge reads 1750, so adjust the mixture until the TIT returns this reading. Do not exceed 1750, however. Again, these performance readings do not apply to other aircraft.

Blackpool to Leeds IFR

Icing will be unlikely in these clouds, temperatures and altitudes, but check outside air temperature anyway and engage your pitot heat and propeller de-icer as needed.

Conserve fuel by changing the propeller pitch at higher altitudes. We found that the Bravo cruises easily at 170 knots and uses 15.16 gallons of fuel per hour with the following engine settings: RPM 2,000, manifold pressure 30 and TIT (1300). If your engine is using fuel too fast, you could run out of fuel short of your destination.

Paying attention to your progress and status is important on a short flight like this. You could easily pass important waypoints before you knew it, if you were distracted, sightseeing too much or fumbling with charts.

Cruise Enroute

Once you have attained our 5,500ft (1,525m) MSL cruising altitude, you may engage your autopilot or maintain altitude and heading manually. Using autopilot relieves repetitive tasks, but being relieved of things to do makes the flight boring. Be sure your cowl flaps are closed whenever cruising. They are not needed, and they increase drag.

This region of England is just along the northern reaches of the major urban areas, and the visual chart reflects that. The VFR chart shows a few cities, towns and airports to the north and a lot of developed areas just to the south. The terrain you might see through breaks in the clouds to the left will be sparsely populated farmland, while the views to your right will show towns and villages.

Check your fuel supply enroute. If you estimated fuel needs accurately and embarked with the needed amount, you should have plenty of fuel to reach your destination. Fuel supply should not be a problem on short flights such as this, but you could run out of fuel short of your destination if your calculations were wrong, your engine is using fuel faster than expected or your aircraft is leaking fuel. Look for an emergency airport if necessary.

Cruising in the yellow zone of your airspeed indicator is all right if there is no turbulence. Abrupt manoeuvres are prohibited at these speeds, but straight and level flight is no problem in calm air. If you experience or expect any turbulence, keep your airspeed in the green zone. By the time you will make sharp turns for the airport approaches, your airspeed will be well within the green zone.

That 18-knot tail wind will add 18 knots to your ground speed and reduce flying time by two or three minutes.

Would you like to fly visually for a while? The weather for today's flight enables 'VFR on top,' which means instrument pilots can fly under visual flight rules while they're above the clouds. Today's low-level clouds top out at 4,500ft (1,373m) MSL, and we're cruising 1,000ft (305m) above them at 5,500ft (1,678m) MSL. This separation between our aircraft and the clouds would allow VFR flight. While flying VFR on top, you will rely on your visual cues from outside the aircraft for maintaining straight and level flight. However, you will still need to use your radio navigation aids to know where you are and going, so this isn't a total abandonment of your instruments. As you penetrate the cloud layer during your descent to Leeds Bradford, you must switch back to IFR. Pilots are required to inform ATC of their changes from IFR to VFR and vice versa.

By the time you're past POL, your ADF will have stopped receiving the Blackpool NDB. So reset your ADF to 402.5 for the Leeds Bradford NDB and head straight for it.

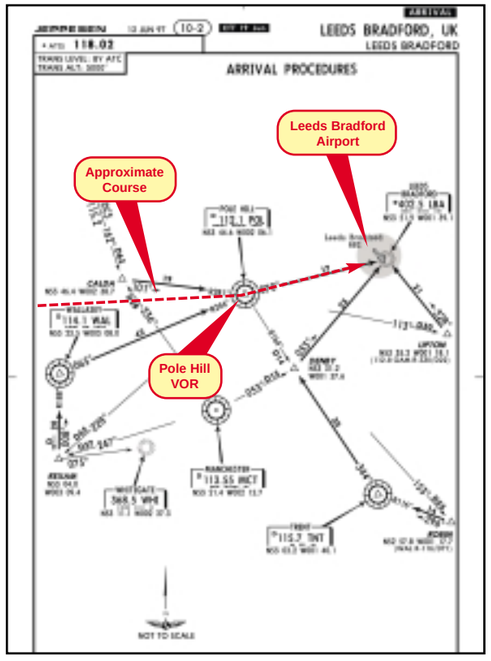
Descent

Physical and weather conditions at Leeds Bradford require our making an important decision well before reaching the airport's airspace. Given today's 18 knot wind from 270, landing on runway 28 would be much easier than landing on runway 32. But at 3,600ft (1,098m) long, runway 28 is less than half the length of 32, which is 7,382ft (2,252m) long, and runway 28 has no instrument assistance.

Fortunately for us, today's weather at Leeds Bradford enables us to land visually if we like. With the cloud ceiling at Leeds Bradford being 2,000ft (610m) MSL and the airport's elevation being 682ft, there's plenty of space between the ceiling and the ground for a 1,200ft (366m) AGL visual approach.

If we choose the visual approach to runway 28, we can enter the procedure at 1,900ft (580m) MSL, which is 1,200ft (366m) AGL. If we choose the instrument approach to runway 32, we must enter the procedure at 4,000ft 1,220 (m) MSL as shown on the instrument approach chart.

Although landing on runway 28 in today's 270 wind will be a lot easier than landing on runway 32, real-world pilots don't always have the luxury of choosing runways. In fact, 28 is too short for commercial airliners, so those pilots lack this option. You might execute one approach on a first flight and the other approach on a second flight.



Leeds-Bradford Arrival

Remember our simple rule-of-thumb formula for determining when to begin descending: number of feet to descend multiplied by 0.003. Also remember that our cruising altitude today is 5,500 MSL.

For the visual approach to runway 28, we need to descend 3,600ft (5,500 minus 1,900). Multiplying 3,600 times 0.003 gives us a result of 10.8 nautical miles. This means we need to begin our descent when 11 miles from the airport.

For the instrument approach to runway 32, we need to descend 1,500ft (5,500 – 4,000). Multiplying 1,500 times 0.003 gives us a result of 4.5 nautical miles. Rounding this result means we must begin our descent when five miles from the airport.

Without a DME at Leeds Bradford, how will we know when our position is these distances from the airport? The DME feature of Pole Hill VOR will tell us how far we are from that point, and subtracting it from the 17-nautical-mile distance to Leeds Bradford will tell us our distance from the airport. For example, we'll be 11 miles from Leeds Bradford when we are six miles past Pole Hill. We can also use time /heading/speed to estimate our position past Pole Hill if we like, and we can always fall back on the GPS reading, which is precise to within 100ft (31m).

Whichever position-plotting method you choose, start your descent when you reach the respective position enroute for your visual or instrument approach. If you think this discussion of descent points is too much trouble, think again. Real-world pilots make decisions and calculations like these frequently.

APPROACH
LEEDS BRADFORD

As you get closer to Leeds Bradford, perform these important tasks: (1) Readjust your altimeter for local pressure, which you will take from your weather report or the airport's ATIS. (2) Turn on your landing lights. (3) Switch to the tank containing the most fuel. (3) Adjust the propeller and fuel mixture as needed. (4) Recheck your fuel quantity. (5) Disengage your autopilot. If you are dangerously low on fuel, request emergency landing procedures from ATC. Otherwise, follow the published approach procedure.

Because of the way Microsoft Flight Simulator 2000 manages weather, conditions at the airport will vary when you arrive in its airspace. The scattered clouds will move from west to east (280 to 100) at 18 knots in accordance with the weather conditions we selected before embarking on this flight. As a result of this cloud movement, exact conditions will differ at various times and for various simmers. Your view upon arriving in the airport's airspace might be obscured by clouds passing through, and it might be clear. With the instrument procedure being right in the middle of the cloud layer, you might be able to see where you're going and you might not. Having no ATC assistance, you just won't know until you get there. With the visual approach being lower than the cloud ceiling, this condition will not matter.

For our visual guidance, follow the very next section and ignore the section following it about the instrument approach. For our instrument guidance, skip the next section and jump to the section after it about the instrument approach.

TIP: Make a flight/situation here so you can practice entering and following the instrument and/or visual course.

The Visual Approach

To do the visual approach to runway 28, enter the basic airport traffic pattern on the downwind leg at 1,900 MSL, then follow the pattern as usual (downwind, base, final). Then land as usual. Your navigation radios will not be needed for this approach, so don't pay any attention to either your OBI or ADF. You'll see how an 18-knot head wind affects your approach and landing. And you'll see that visual approaches and landings are not always as easy as many flight simmers think they are!

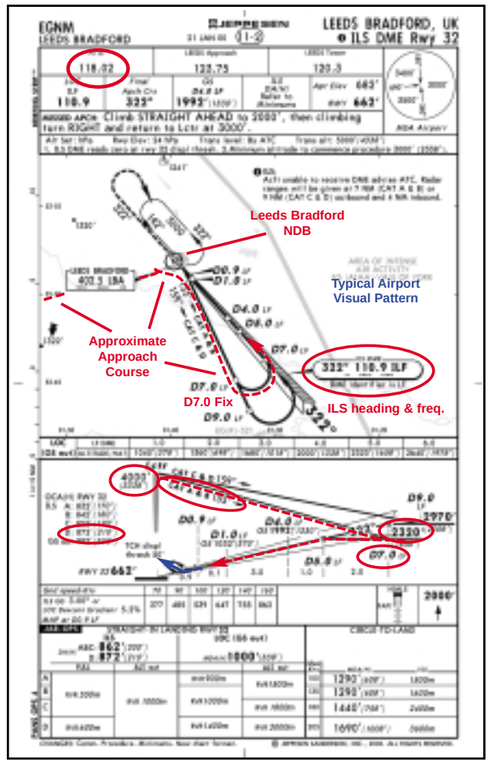
The Instrument Approach

The instrument approach calls for a procedure turn off the Leeds Bradford NDB. Notice two procedure turns depicted on the plan view. One is for aircraft approach category A and B, and the other is for category C and D. Our Bravo is a category A aircraft, so we must follow the Cat A and B procedure.

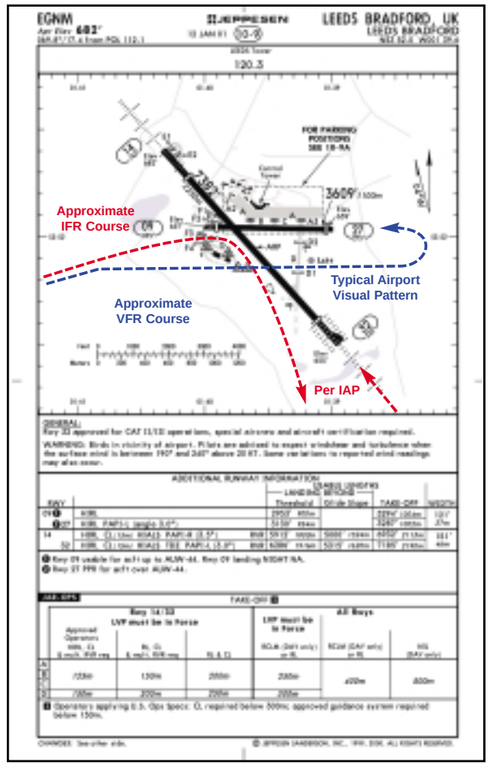
Well before arriving at the airport, change your Nav 1 radio to its ILS frequency of 110.9 and your OBI to the runway heading of 323. If your ADF isn't already set at 402.5 for the NDB, do that now. Check your altimeter again to be sure it's set for the correct pressure at Leeds Bradford. Fly to Leeds Bradford NDB, then head 156 degrees on the Cat C & D procedure. Adjust your heading as necessary to keep the ADF needle pointing straight behind you as you head 156 from the NDB. Also notice on the profile view two altitudes depicted. The altitude for our Cat A approach is 2,320ft (708m). So as you are heading 156 on this procedure, descend to 2,320ft.

As you head 156 from the NDB, monitor your distance from the ILS transmitter on your DME 1. When you reach the fix labelled D7.0, which is seven nautical miles from the ILS transmitter, begin a left procedure turn of 193 degrees. During this turn, lower your flaps one notch and your landing gear fully. Don't fret if you don't exit this left turn precisely on the 323-degree ILS localiser beam. This manoeuvre is challenging even for experienced pilots – especially in 18-knot crosswinds!

Adjust your heading as necessary to align and stay aligned with the localiser beam to the runway. When you reach D5.0, which is five nautical miles from the ILS transmitter, you should intercept



Leeds-Bradford ILS DME



Leeds-Bradford Airport

the glide slope. Adjust your descent as necessary to maintain your glide along the glide slope indication on your OBI 1. Maintaining 110 to 120 knots on the approach will require a bit more power, because this 280 wind is both crosswind and head wind for this 323 approach.

When you reach an altitude of 832ft (254m) MSL, you will be 170ft (52m) above ground level and at the minimum decent height for this instrument procedure for our aircraft. If you can see the runway ahead of you from this point, proceed with your landing. Otherwise, abort the landing and follow the missed-approach procedure.

Having descended below the cloud ceiling, your view of the runway should be clear. If you cannot see the runway ahead of you, your aircraft must be so far off course that it's too far to the left or right or too high for a safe landing. If any of these conditions are true, you have executed this procedure poorly and you should definitely practice it until you get it right. As you land, you will struggle to keep your aircraft on the runway centreline in this 18-knot wind. The aircraft's behaviour will change as its airspeed reduces. Keep focused, and don't allow your aircraft to veer off the runway.

Missed Approach?

If you are not positioned for a safe landing, execute the missed approach. The chart calls for climbing straight ahead to 2,000 MSL, then a climbing turn to the right and a return to the locator (NDB), then a repeat of the procedure from there.

CONGRATULATIONS

You have successfully approached and landed at an airport of a higher elevation than the airport you departed. Well done, indeed! Keep flying this tutorial to build your proficiency. Apply stronger winds and turbulence and advance to more sophisticated aircraft to make it more challenging if you like. For more information go to the website at www.topskills.com/flitsim.htm.

See you next time. ■

Bill Stack

A CHANGE OF SCENERY

"Scramble - new terrain at angels one-five!"

Not long after Empire's Battle of Britain was released in the UK, JayP brought out a terrain modification based on altered tiles from the original Combat Flight Simulator. These tiles are some of the same ones that were previously used to create higher detail terrain for European Air War. The difference in EAW was impressive and we have flown with the revised terrain since it was available.

Jay's release of new terrain for Battle of Britain comprised about one third of the total terrain tiles in the simulation. Admiring what Jay had accomplished, we spent about sixteen hours looking over other tiles and then replaced ALL the landscape textures in Battle of Britain.

Terrain Image, original textures

The process was much more time consuming than we had expected. Our first efforts looked better in general, but there were many areas where the tiles blended badly, with abrupt transitions and obvious lines where the tiles joined together. Thus began a painstaking reconstruction of many of the tiles, in some cases changing individual pixels.

The end result is, we think, quite good, and much improved in overall appearance from the default terrain of Battle of Britain. In particular, there is much greater variety in the terrain and it looks much better from medium and high altitudes.

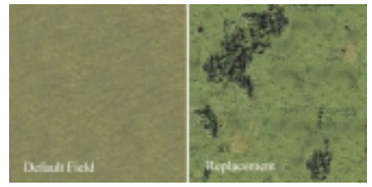
Pastoral texture from the original scenery

Here are some individual comparisons of original tiles with the modified tiles. First, a general pastoral texture from the original is on the left.

Next, the unaltered replacement texture on the left, with the final modified texture on the right.

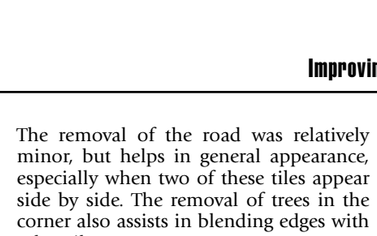
The removal of the road was relatively minor, but helps in general appearance, especially when two of these tiles appear side by side. The removal of trees in the corner also assists in blending edges with other tiles.

On the left, below, is an example of the terrain texture in Battle of Britain from an open field. On the right is the modified replacement.



However, the bottom line is how all this looks in the actual game itself and whether it affects placement of buildings and targets. After much time spent flying around it is apparent that airfields, buildings and targets and even roads are unaffected.

The following image shows an error in screen capture with part of our Hurricane showing in the right center of the image, but you can see how nicely the airfields integrate into the new terrain.



An RAF airfield in the new terrain

One of the greatest areas of improvement is integration of cities into the countryside. The original terrain left cities dropped into the surrounding country with no transition areas. In Figure 1 you can see the original terrain, with the developed area interrupted abruptly by landscape tiles. The straight-line boundaries look quite unnatural. In Figure 2 and following images you can see developed areas much better integrated with terrain.

Figure 1. Coastal town with original textures.

Figure 3 is an image showing a similar area near the coast using new tiles. Notice the beautiful transition and integration of the city area into the countryside.

We chose and modified tiles for these areas which included portions of countryside.

Figure 2. Coastal town and new textures

Not wishing to keep this to ourselves, we thought we'd give our readers the opportunity to replace your terrain with the new textures. Landscape texture files for Battle of Britain are found in the Landmap2 and Landmaps directories. There are 31 landscape texture files in each directory, including textures for sea and sky. The files end in the .x8 extension.

Figure 3. The secret's in the blend!

The zip file included on the cover CD with this issue is 3Mb in size and contains 27 files for the landmap2 directory, plus another 26 files for the landmaps directory. Simply backup your original files, then overwrite the files in their respective game directories with the new ones. The files you see when you open the zip file go to your landmap2 directory. The files in the landmaps zip file go to your landmaps directory. Once this is completed, start up the program as normal. ■

Leonard Hjalmarson

A SPRUCED UP HURRICANE

We've also included on the CD a new aircraft paint scheme for Battle of Britain. This is a Hurricane Type I with large roundels, originally painted by 'Captain Farrel'. Len had a fiddle with it, cleaned up the roundels and some artefacts on the tail. He broke the red tape over the guns as if the guns had been fired, and modified and improved the landing lights. We hope you like it.

Hercules Prophet 3D 4500

PowerVR to the Rescue

Will it be worth staggering home with this box?

Ah, the great video card parade… marching forward with an occasional dropout here and there, replacements waiting in the wings. The startling purchase of 3dfx by nVIDIA last winter had people thinking they (nVIDIA) might totally dominate the market. There is no denial of their number one position, but to who else might fussy simmers like us turn to? ATI has provided a fairly decent 3D chip, the Radeon II, but it has not captured a great deal of attention. Matrox, meanwhile, has turned its attention away from gamers towards big business and corporate needs. That doesn't leave much of a selection for anyone looking to upgrade an ageing graphics card.

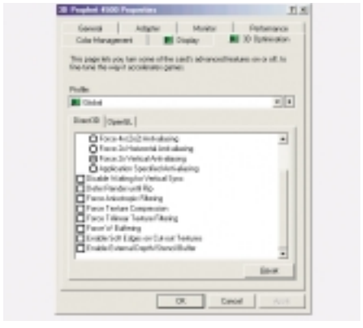
Coming to market with a new graphics chip dubbed the KYRO II, Hercules (owned now by Guillemot) has taken a reference design board and produced the 3D Prophet 4500, a 64MB graphics card with a suggested retail cost of a comfortable £117.00. PowerVR, a British company (yes folks, there are still a few that sell something other than insurance!) and subsidiary of Imagination Technologies, holds the copyright on the Kyro II chip and its feature set known as "Tile-Based Rendering". It is this feature that caught our eye back in March when the previews of KYRO II were first revealed. Tile-based rendering technology, according to its designers, processes only the visible surfaces of a 3D scene. This is the explanation directly from Imagination Technologies:

"The unique tile-based rendering approach of PowerVR breaks a 3D scene into tiles, processing only the visible surfaces on each before displaying them on the screen. Because of the smaller size of a tile compared to a full screen, this approach allows on-chip processing of large amounts of data, eliminating unnecessary accesses to external memory. Additionally, the algorithms used require that only visible surfaces are processed by the 3D engine, further reducing the memory and bandwidth bottlenecks suffered by traditional 'brute force' technologies. Using patented tiling techniques PowerVR provides an elegant, scalable architecture that is truly efficient and achieves three times the fill rate of competitive technologies with the same clock speed and number of pipelines."

One might conclude then, that a congested city such as Paris or New York might benefit from this process with regards to performance. If in fact hidden buildings, bridges and so forth were not rendered until they actually came into view, it seems reasonable to assume this. Thus, our curiosity level and expectations of the Kyro II were quite high as we began to explore its capabilities.

Installation and Setup

The OEM version of the 4500 was provided by our local 'supply house', PC Chips in Keene, New Hampshire, USA. OEM means no-frills, no extra goodies; only the driver CD and rather attractive blue PCB (printed circuit board) complete with fan and heat sink were packaged. The CD contained a demo of Temple, a 3D journey through the labyrinth of an Egyptian pyramid, or so it appeared.



It's a breeze to set up

Hercules 3D Prophet 4500 Features

- 300MHz RAMDAC
- Optimized use of 64MB on-board SDRAM
- 175MHz Core Clock
- 175MHz Memory Clock
- Internal True Color™ blends pixels on-chip at 32-bit color so as not to lose any color precision, then outputs in either 32-bit or 16-bit – depending on mode
- Full Scene Anti-Aliasing (FSAA) even in high resolution
- Environmental Bump Mapping (EBM) simulates rough and bumpy textures with irregularities
- 128-bit GUI accelerator
- DMA bus mastering for minimum CPU load
- Video playback & MPEG2 decode
- SGRAM/SDRAM 128-bit interface
- 1920x1280 true color at 75Hz refresh
- AGP 2X/4X

Test System:

AMD Thunderbird 1.2GHz, 266MHz Bus
EPOX 8KTA+ Motherboard
512MB PC133 SDRAM
Sound Blaster Live Value
Maxtor 45GB 7200rpm ATA100 Hard Drive
Windows Millenium
FS2000 with Patch 2

While this obviously was designed to show off the attributes of the Kryo II, we were much more curious about Combat Flight Simulator 2, X-Plane, and Flight Simulator 2000. A silky smooth install followed and we quickly dove headfirst into the driver utilities.

With fast, easy access to the card's features, the 4500 Prophet offers plenty for your exploring pleasure. Full-scene anti-aliasing is the most common reason to visit here. Unique to the Kyro II is its ability to offer two versions of 2-sample anti-aliasing in addition to 4-sample (highest quality). Referred to as vertical and horizontal anti-aliasing, in reality only the horizontal proved itself worthy of turning on. Engaging the 2x vertical seemed to have no effect on jagged edges.

Performance Tests with Flight Simulator 2000

We pitted the Kyro II against another cost efficient solution, the Visiontek GeForce2 MX (32Mb). The situations were as follows: Meigs default flight in cockpit view, the Meigs default flight in spot plane view and a cockpit view from the Mooney Bravo, runway 11 at KEWR (Newark), which included some low cumulus clouds and the distant skyline of The Big Apple.

You can see the frame rates detailed in the tables below for each scenario and screen resolution.

This image is from the GF2MX with 1280x1024 resolution and 2-sample anti-aliasing enabled

The same settings with the Prophet 4500. It looks better on-screen, honest!

Hercules 3D Prophet 4500 Anti-Aliasing Disabled

	1024x768x16	1152x864x16	1280x1024x16	1024x768x32	1152x864x323	1280x1024x32
Meigs Default	37.2	36.7	35.6	36.1	5.5	34.0
Meigs Spot	31.7	31.1	29.2	29.9	28.4	26.2
Newark	37.1	35.9	35.7	36.2	35.5	33.9

Visiontek GeForce2 MX Anti-Aliasing Disabled

	1024x768x16	1152x864x16	1280x1024x16	1024x768x32	1152x864x323	1280x1024x32
Meigs Default	39.4	39.5	37.8	38.8	37.4	38.6
Meigs Spot	35.9	32.3	28.0	29.8	26.1	22.2
Newark	41.4	41.1	40.3	40.5	39.9	39.6

Hercules 3D Prophet 4500 Anti-Aliasing Enabled

	1024x768x16	1152x864x16	1280x1024x16	1024x768x32	1152x864x323	1280x1024x32
Meigs Default	31.8	34.1	32.7	32.2	32.8	31.9
Meigs Spot	23.6	26.9	24.9	23.2	25.8	23.7
Newark	32.6	32.6	30.1	29.2	32.1	29.9

Visiontek GeForce2 MX Anti-Aliasing Enabled

	1024x768x16	1152x864x16	1280x1024x16	1024x768x32	1152x864x323	1280x1024x32
Meigs Default	34.5	35.7	31.2	27.1	22.8	27.8
Meigs Spot	13.6	18.0	15.2	14.7	12.3	22.2
Newark	35.0	37.3	36.0	29.0	30.9	29.7

Look out for this sign in your local chip shop

Thumbs Up

The overall image quality of the Hercules 4500 is quite excellent, in both 2 and 3D. The anti-aliasing feature in Direct3D (CFS2/FS2000) and OpenGL (X-Plane) is most impressive, nearly equalling the superb 3dfx Voodoo5 we had been using. Stability was impeccable and not once during five days of testing did the board cause a system lock up. Performance wise, the good news goes to those insistent upon 32-bit colour with anti-aliasing engaged. Additionally, spot plane view in Flight Simulator 2000 provided high frame rates, a particular weakness of GeForce2 MX with anti-aliasing enabled.

Certainly one has to mention the value aspect. A 64MB graphics card with fan, heat sink, and a full feature set for under £120 is very attractive, especially if the card can deliver the goods.

Thumbs Down

The only noteworthy criticism we could find was its 16bit-color performance, which suffered terribly in Flight Simulator 2000 when compared to a Visiontek GeForce2 MX (see below), at least with anti-aliasing disabled. We occasionally noticed some distant sky flashing in Combat Flight Simulator 2, and hopefully this will be addressed in driver updates.

Test Observations, Conclusions and Hopes

It's quite clear that the Kyro II is best suited to those seeking the highest of graphics quality as their number one criteria. It can handle spot plane flying with the greatest of ease, and do it quite handsomely, something the other budget cards have difficulty with. Combat Flight Simulator 2 and X-Plane ran without any problems, except for the random flashing mentioned above in Combat Flight Simulator 2. This occurred so infrequently, however, it was not considered a major issue and should be fixed with driver updates.

Those looking to upgrade from TNT, TNT2, or Voodoo3 will benefit the most from this board. It is doubtful current GF2MX users will get any satisfaction from the younger KYRO II chip.

So there it is. Stout 32-bit colour, high-resolution performance, a price that won't make you choke, rock solid stability and a dash of anti-aliasing. What else is there? ■

Greg Gott

REVIEW SCORE:

Manufacturer: Guillemot Corporation
Price: £120.00 (approx)
Website: www.thrustmaster.co.uk
Release Date: Out Now

At a glance: Good 32-bit colour, high-resolution performance, a price that won't make you choke, rock solid stability and a dash of anti-aliasing. Well worth a visit to the shops with your piggy bank and a hammer.

TRUST Televiewer

Get your flight simulator onto the big screen

If you want to see whatever is on your computer monitor come up on your TV screen, then this little gadget will do it for you. It has been designed for gamers who like things BIG. But of course, it is only any use to you if you actually possess a large TV. Also, your TV and your computer need to be in the same room.

The Televiewer is a silver metalled box about the size of a bar of soap. It comes with a huge range of connectors and wires to serve almost any type of connection you might want. Indeed, we would think that the connectors and the super little screwdriver are worth the price on their own (well, almost). It is powered by your keyboard connector and the monitor/TV screen connector is merely split from your computer output socket. It is possible to connect to a VCR and make video tapes of your flights too if you wish. A twelve language manual comes in the box but the English language seven pages are quite enough to tell you all you need to know.

A little adjustment is required to your computer screen as the Televiewer will only support certain resolutions at a certain number of Hz. We found the product works well and is simple to set up. However, you may not be entirely happy with the kind of resolution which a TV screen gives compared with the best monitors. If you want a big picture, you get one the size of your TV but not so sharp as a computer. The same restriction applies if you make a videotape. It works fine but is a bit blurred. Also, of course, the Televiewer is only concerned with the picture, so you get no sound on your tape. Nevertheless, this can be added later if you are that way inclined. It may also be used for presentations as it can be connected to an overhead projector.

The Trust Televiewer connected up – it's a compact little device

This is what it does in theory - in reality you won't get this sort of resolution!

Trust also make a USB Video editor which comes with its own editing software and is an inexpensive way to make small video clips using a webcam. These can then be sent via email to friends.

Trust products are available from most computer shops or from Maplin Electronics. It may be one of those things that you buy and then try to find a use for (we've got a shed full of those) or it may be just what you're looking for. ■

Christopher Jarman

REVIEW SCORE:			
Manufacturer:	Trust	**Price:**	£59.99
		Release Date:	Out Now
Website:	www.trust.com		

At a glance: Ideal for anyone messing about with larger views and probably going to be a big hit with cockpit builders.

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Downloads

Star performers from the Internet

As more sophisticated design tools become available the quality of freeware files is steadily increasing with each issue. Here are some of the most recent files complied from the more prominent flight sim web sites around the world. If you have trouble finding the files, do a search on the site for the aircraft type.

LEPA2000 - Palma de Mallorca — Flight Simulator 2000 Aircraft

This month's star download is an outstanding rendition of Palma airport in Majorca (Mallorca) from Oliver Pabs. Version 2.0. Featuring excellent photorealistic textures, remarkable dynamic/static vehicles and an attention to detail that those who regularly fly to Majorca will appreciate. The dynamic aircraft change approach configuration with the prevailing winds and as you taxi off the runway you'll be met by the follow-me car. Outstanding quality!

Authors: Oliver Pabs

Download From: www.avsim.com
Filename: lepa2k20.zip

Beechcraft Twin Bonanza Excalibur 800 — Flight Simulator 2000 Aircraft

This aircraft and panel set was created with Abacus Design Studio. It features full moving parts, authentic checklist and the panel has interior side views. Dick Ward the author of the book "Beechcraft Twin Bonanza - Craft of the Masters" instigated the design and supplied much of the source material.

Authors: Tom Miller and Dick Ward

Download From: www.avsim.com
Filename: n800exv6.zip

Piaggio P180 Avanti — Flight Simulator 2000 Aircraft

If you're interested in unusual designs, then the Piaggio P180 designed by Massimo Taccoli is well worth the download. It depicts the fastest FAR 23 certified turboprop aircraft now in production, capable of a maximum cruising speed of 400 Kts at 27,000ft. It has full moving parts, including control surfaces, retracting gear with accurate gear/door sequences and steering nose wheel.

Author: Massimo Taccoli Panel by Marco Spada

Download From: www.avsim.com
Filename: p180_ava.zip

North American Rockwell OV-10A Bronco — Flight Simulator 2000 Aircraft

The Bronco is another break from convention with its unusual configuration, used to great effect by the USAF during the Vietnam era in the role of close air support and observation. The model depicted here features a superb high-resolution panel with excellent visibility.

Author: Jeffrey Nissen

Download From: www.flightsim.com
Filename: ov-10a.zip

Eurocopter EC120B — Flight Simulator 2000 Panel

There are many more fixed wing aircraft designers than helicopters, so this first effort from Rob Beard is well worth a look. It features a very detailed and realistic model with a transparent cockpit, combined with a panel that is usable but needs a high resolution monitor in order to read the rather small gauges.

Author: Rob Beard

Download From: www.flightsim.com
Filename: ec120.zip

Sikorsky HH-60 JayHawk — Flight Simulator 2000 Scenery

Here we have another excellent chopper designed by Dwight Booth who informs us that this is his fourteenth aircraft and by far the most ambitious. Both the detailing on the aircraft and the sheer number of animated parts make this a must have file. The undercarriage depresses on contact with the ground, the rescue basket lowers, the pilots heads move, in fact all you'd expect from a good add-on.

Author: Dwight Booth

Download From: www.flightsim.com
Filename: Jayhawk.zip

B767-300 Panel and Aircraft — Flight Simulator 2000 Panels

This is a very comprehensive package depicting the B767 aircraft and panel. It includes an Overhead Panel, Control Pedestal, cockpit lighting, new cockpit views, windshield wipers and pushback HUD. The package also contains two aircraft, a United Airlines Boeing 767-322ER and a Aeroflot Boeing 767-300ER designed by Project Opensky

Author: Nikolay Poriazov

Download From: www.avsim.com
Filename: np767er.zip

Cairns International Airport — Flight Simulator 2000 Scenery

For those that may not know, Cairns airport is in Australia. It was designed after a request from a resident of that town who sent lots of photos etc. to the author John Walker. The scenery was designed using Airport 2.6 and FS Design Studio and includes what appears to be a DC3 mounted on a pole on the approach road to the main terminal. We're sure it's there or John would not have included it!

Author: John Walker

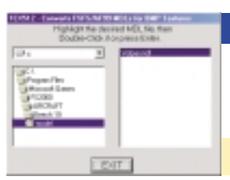
Download From: www.avsim.com
Filename: cairns_v2.zip

Kansai International Airport — Flight Simulator 2000 Scenery

Anyone who saw the Building an Airport series on TV will recognise this airport, it was designed by Enzo Piano and built on a man made island off the coast off Japan. The scenery files come with photo realistic buildings, static aircraft, utility vehicles, and show huge architectural structures where building work is still under way.

Author: Satoru Tajiri

Download From: http://flightinfo.ens.ne.jp/tajirin/
Filename: kix2001.zip



FSFS/AF99 texture converter — Flight Simulator 2000 Utility

A simple little utility designed for those that like to paint their own aircraft. It converts aircraft MDL files created with FSFS or AF99 to use BMP textures. Re-painters may then use 512x512 or 1024x1024 textures with these older aircraft. It works only in Flight Simulator 2000 and CFS2, and requires Visual Basic 5.0 drivers.

Author: Chuck Dome

Download From: www.flightsim.com
Filename: tex512.zip

FS People set 1 — Flight Simulator 2000 Utility

The next utility is a bit different because it allows you to populate those generally desolate airports with people. Unfortunately it's an API aimed at scenery designers and not designed for anyone unfamiliar with the techniques and tools needed.

Author: Jeremiah Broughton

Download From: www.avsim.com
Filename: fspeople.zip

Wing views — Flight Simulator 98 & 2000 Utility

This zip file changes the default cockpit side views for any aircraft to show a wing view, complete with engines. It doesn't do anything else but makes a change for those who like to collect screen shots.

Author: RFrank Elfert

Download From: www.avsim.com
Filename: 744_wingview_fs2k.zip

Bigjet Panel Replacement — Flight Simulator 98 Panel

If you'd like to improve the default FS98 big jet panels, or have downloaded other aircraft that need them, this file is for you. It contains a complete replacement panel set for any 2, 3 or 4 jet engine aircraft. Particularly recommended for use with... B727,B737,B747,B757,B777,A320,A340 MD11,DC10 aircraft.

Author: Wayne Rodgers

Download From: www.flightsim.com
Filename: tvappv21.zip

BETA Cargo Boeing 707-320B — Flight Simulator 98 Aircraft

The combined efforts of the J-Planes team have recreated one of the most successful jet airliners ever built. Featuring maximum moving parts, night lighting, more realistic flap and gear speeds, every knob, switch and light works, mechanical digital readouts, blinking warning lights, authentic digitally optimised 707-320B sounds, and 707 checklists.

Authors: J-Planes ,

Download From: www.flightsim.com
Filename: j707.zip

Piper PA-38 Tomahawk — X-Plane Aircraft

The Piper PA-38 Tomahawk is one of the most popular aircraft for flight training here in the UK. This aircraft/panel set depicts an aircraft that the author Chris Buff originally did his first solo in. It comes with a high quality panel that closely replicates the original.

Authors: Chris Buff

Download From: www.flightsim.com
Filename: pa38xpln.zip

Dash 8 — X-Plane Aircraft

This Bombardier DASH-8 Q100 is a re-paint of an original aircraft designed by Greg Hofer. It comes with an accurate flight model and photo realistic panel shown here as the sun is setting.

Author: Greg Hofer and Allen Lavigne

Download From: http://www.avsim.com
Filename: xdash8ja.zip

Product Listings

Our comprehensive round up showing our favourites from the many products we've evaluated over the months. Please note that the prices indicated are the RRP where available, but remember the dreaded VAT. Be sure to check for bargains at your favourite sim emporium as there are often savings to be made!

CIVIL SIMS

Elite 6.0

Undoubtedly the best IFR procedural trainer there is. So it should be, the frightening price will put off all but the truly serious - the full kit can cost £695 or more with the new scenery add-on.

Initiative Computing £249.95 — **www.flyelite.com** — **Featured:** Issue 4

Flight Simulator 2000

Despite much publicised criticism over poor frame rates and misleading PC requirements, this still seems to be the benchmark sim. An awful lot of sim for the money, but invest in a decent PC before buying.

Microsoft £49.99/£69.99 — **www.microsoft.com** — **Featured:** Issue 2

X-Plane

Not for beginners or casual flyers, but definitely the 'thinking man's flight sim' - it's even compatible with a Mac, you can fly on Mars (among other places) and we loved the flight model. It also gets regular updates so Internet access is a must.

Laminar Research £various — **www.x-plane.com** — **Featured:** Issue 6

Precision Simulator 744

A no compromise and no-frills approach to flying a Jumbo Jet. No pretty scenery or advanced terrain but probably as close as you'll ever get to the real thing without a trip to a full motion airline simulator.

Aerowinx £189.99 — **www.aerowinx.com** — **Featured:** Issue 6

Airline Simulator 2

Some of the best airline flight modelling around with accurate procedures (it's been designed by real airline pilots over many years). Unfortunately not for the faint of heart - old DOS interface and daunting controls a real put-off. A lot cheaper these days, so may be worth a look.

Just Flight £49.99 — **www.justflight.com** — **Featured:** Issue 1

ATC Simulator

An amazing, if slightly flawed, foray into the world of ATC. Get behind the mike and start stressing out!

PC Aviator £54.95 — **www.pcaviator.com** — **Featured:** Issue 11

FlitePro

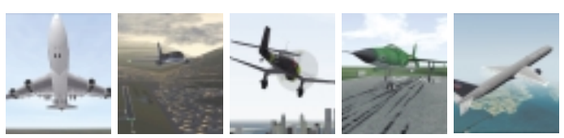
Offers a wide range of training features for the IFR pilot, yet reasonably affordable. Low frame rate for instruments detracts from its overall appeal.

Jeppesen £99.99 — **www.flitepro.com** — **Featured:** Issue 4

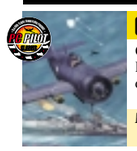
Fly!

Overshadowed by Microsoft's mighty sim, Fly! has gathered a loyal following. Thought to be better than its rival and some excellent add-ons (and patches) enhance the appeal from when we originally rated it. Available at less than £10 in some stores so a true bargain!

Take 2 £39.99 — **www.iflytri.com** — **Featured:** Issue 1



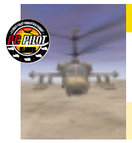
COMBAT



Combat Flight Simulator 2

Quite simply the best all round WWII flight simulator there is. However, make sure you've got a decent PC to take full advantage of the looks and feel.

Microsoft £29.99 — **www.microsoft.com** — **Featured:** Issue 8



Enemy Engaged: Comanche vs. Hokum

Strikes the balance between gameplay and realism perfectly. Ideal for both rocket junkies or rotorcraft rookies alike. Only downside is no single mission mode and it's not as pretty as Gunship.

Empire £29.99 — **www.enemyengaged.com** — **Featured:** Issue 5

Eurofighter Typhoon

In a class of its own - beautifully combines fast jet flying with realism and action.

Just Flight £29.99 — **www.rage.com** — **Featured:** Issue 11

Harrier Jump Jet

Fly 17 different versions of the unique Harrier - great VSTOL experience, plus other aircraft missions and scenery that recreates the Falklands War.

Rage £24.99 — **www.justflight.com** — **Requirements:** FS98/2000 or CFS — **Featured:** Issue 11

Flanker 2.0

Excellent, with great detail. This is one of the few combat packages that is worth calling a simulation. Online fan base will prolong longevity and now there's an update as well.

Mindscape £34.99 — **www.ssionline.com** — **Featured:** Issue 2

Janes F/A 18

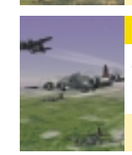
Technically complex with masses of detail and lots of options. Mission builder is nice. Downside is that it is technically complex and you need a high-spec PC.

Electronic Arts £39.99 — **www.janes.ea.com** — **Featured:** Issue 5

Battle of Britain

Superb flight modelling and the best dynamic campaigns ever are what hardcore dogfighters have been waiting for. Tough on beginners but worth persevering.

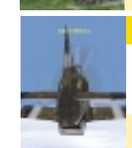
Empire £24.99 — **www.empireinteractive.com** — **Featured:** Issue 9



B17-II The Mighty Eighth

Excellent sound, motion animation, outstanding graphics and T&L support, it looks good and flies even better. The ultimate bomber sim, but demanding on hardware and no FF support.

Hasbro £29.99 — **www.b17flyingfortress.com** — **Featured:** Issue 9



Fighter Ace II

If you've got a fast Internet link and you fancy some live (for the moment) opposition, then this is as good an introduction as any to combat on the web. Excellent graphics and a reasonable cost.

Microsoft £6.50 per month — **www.zone.com/fighterace** — **Requirements:** Internet link/modem — **Featured:** Issue 7

Air Power - The Cold War

Nato vs The Warsaw Pact - relive the days when "njet!" meant "get in the bunker, the reds are coming!" Now with CFS missions and campaigns this has evolved into an excellent add-on.

Just Flight £24.99 — **www.justflight.com** — **Requirements:** FS98/2000 or CFS — **Featured:** Issue 7

SCENERY AND AIRCRAFT

FS Traffic

Perhaps the best £20 you can spend enhancing Flight Simulator - it really does bring airports to life. Now in boxed and download flavours.

Just Flight £19.99 — **www.justflight.com** — **Requirements:** FS98/2000 — **Featured:** Issue 2

747-400 Professional

Quite simply the best Jumbo add-on for FS2000 we've seen and if you like this you'll also like the 777-200 from the same stable. Read the manual and you'll probably be able to fly the real thing!

Just Flight £34.99 — **www.justflight.com** — **Requirements:** FS2000 — **Featured:** Issue 9

767 Pilot in Command

A new level of excellence for this jet airliner for FS2000. Worth every penny for the abundance of features.

Just Flight £24.99 — **www.justflight.com** — **Requirements:** FS2000 — **Featured:** Issue 10

Airport 2000 Volume 2

Incredibly detailed renditions of major airports with decent aircraft and adventures. Sadly a frame-rate hog in both FS98 and 2000 and adventures are complex.

Just Flight £29.99 — **www.justflight.com** — **Requirements:** FS98/2000 — **Featured:** Issue 4

FS Clouds 2000

Fantastic effects with a minimal frame-rate hit and apart from a few graphic glitches it is a worthwhile improvement on Microsoft's own fluffy stuff.

Just Flight £24.99 — **www.justflight.com** — **Requirements:** FS2000 — **Featured:** Issue 6

German Airports 3

Wonderful enhancement for those interested in flying to the Fatherland. Like all beautiful things though, can drain system resources alarmingly.

Aerosoft £24.99 — **www.aerosoft.com** — **Requirements:** FS98/2000 — **Featured:** Issue 4

Mad Dog 2000

Now updated and running in FS2000, a very competent add-on that makes FS2000 feel like a different simulator. Not cheap, but it's much more than just one aircraft.

Lago £34.99 — **www.lagoonline.com** — **Requirements:** FS98/2000 — **Featured:** Issue 7

Real Airports

Some very well executed versions of international airports. With an excellent manual and some adventures, this is a good value package.

Just Flight £29.99 — **www.justflight.com** — **Requirements:** FS2000 — **Featured:** Issue 10

737 for Fly!

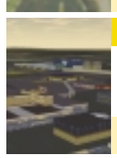
A meticulous re-creation of the 737-500 for Fly! Superb detailing is only let down by blurry external textures. Not many commercial add-ons for Fly!, so worth having!

Wilco £18.95 — **www.wilcopub.com** — **Requirements:** Fly! or Fly!2K — **Featured:** Issue 6

Rhein-Ruhr for Fly!

An excellent addition to Fly! for Europeans - could do with a few more buildings, but all the landmarks are there.

Aerosoft £25.99 — **www.aerosoft.com** — **Requirements:** Fly! & Fly!2K — **Featured:** Issue 10



English Airports

A vast improvement on the default scenery and while it isn't as instantly impressive as some scenery, it actually works in FS2000 without needing a new PC.

Just Flight £19.99 — **www.justflight.com** — **Requirements:** FS2000 — **Featured:** Issue 8

HARDWARE

AFCS II Yoke

Heavy metal control, hand crafted and definitely the Aston Martin of controllers. Eye-watering price to match, so you need to be serious.

AETI £400.00 — **www.simpilot.com** — **Featured:** Issue 3

GeForce 2 GTS

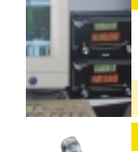
Fantastic performance, a powerful feature set and frequent driver revisions to keep it fresh - probably the current champion (until the next one!)

nVIDIA £205.00 — **www.nvidia.com** — **Featured:** Issue 8

Sirocco Crossfires

Probably the best speakers for your PC before it becomes your hi-fi. Not recommended for small flats!

Videologic £235.00 — **www.videologic.com** — **Featured:** Issue 6



Go Flight GF45

A very useful item - no fuss USB unit that takes the place of on-screen avionics display and keyboard controls - buy five for a full radio stack!

Go Flight £79.95 — **www.goflightinc.com** — **Featured:** Issue 7

Logitech Wingman Strike Force 3D

Powerful and smooth force feedback with extensive programmability makes this a wise choice. Shop around as prices vary wildly.

Logitech £89.95 — **www.logitech.com** — **Featured:** Issue 9

OTHER PROGRAMS

SimCharts

Genuine Jeppesen airport charts (to all intents and purposes) at a bargain price. But they're on the CD and you need a decent printer. Treat yourself to the expensive pack and get printed en-route charts too.

Jeppesen £19.99/£29.99 — **www.jeppesenpcpilot.com** — **Featured:** Issue 2

ProFlight 2000

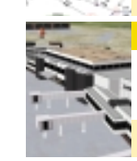
One of the best ATC/adventure generators around, with enough customisation potential for everyone. Plan adventures with real voice ATC - even with amusing 'local' accents.

Just Flight £34.99 — **www.justflight.com** — **Requirements:** FS2000 — **Featured:** Issue 8

Final Approach

Good value package that not only solves the mystery of IFR approaches, but also provides fistfulls of airport plates too. Not for the casual flyer though.

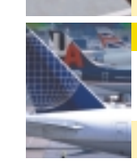
Just Flight £24.99 — **www.justflight.com** — **Featured:** Issue 5



FS Design Studio Pro

A great package for designing scenery and aircraft. While relatively easy to use it can be tricky to place scenery accurately. Used by many developers, which proves its worth.

Abacus £24.99/£44.99 — **www.abacuspub.com** — **Requirements:** FS2000 — **Featured:** Issue 5



Ultimate Airlines

A comprehensive list of worldwide flights - a must have for VA pilots or anyone wanting to recreate airline operations.

Flight One £24.99 — **www.flight1.com** — **Requirements:** FS2000 — **Featured:** Issue 9

THE *ONLY* HUB FOR VIRTUAL AIRLINES

GO for it!

This month's featured VA is Go-Virtual. Their CEO, Daniel Trudgian told us: "Unlike many VA's that I have seen and been a member of, we are attempting to give all our pilots a welcoming and friendly environment. We are not collecting pilots to become the biggest VA, nor are we attempting to take on the big boys, but instead look after all our pilots". PC Pilot is pleased to help Daniel get the ball rolling by rewarding two of his pilots with a complimentary copy of PC Pilot for the efforts they have put in recently. Stephen Jones, Pilot Number GO 011 and Yousef Ingi Tamimi, Pilot Number GO 025 have been nominated by Daniel for their dedication, hours flown and suggestions on how to improve the airline. We wish them well.

Derek Smalls

go-Virtual

CONTACT DETAILS
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daniel@trudg.freeserve.co.uk
Website: www.trudg.freeserve.co.uk

MORE VAs AROUND THE GLOBE

As you'll see from this month's editorial it's getting increasingly risky running a VA that's based on a real airline. We'd strongly suggest that anyone running such a VA or planning one, gets some written authorisation. Most airlines will probably say no, but if you put your case logically to the PR department that you're 'fans' they might well understand. Part of the success of the UK haulage firm Eddie Stobart has been encouraging people to become 'Friends of Eddie' and becoming 'Eddie Spotters' when they see their lorries. Maybe the airlines should take a leaf out of their book.

We've had so many requests to include details of VAs that for reasons of space it's been necessary to remove all the descriptions. You can always get the flavour of a VA from a quick trip to their website. Please let us have any feedback on your experience of VAs that we list and also let us know if any of the links are incorrect or defunct. If you have a virtual airline that is not listed here, then please feel free to send in a short description to mail@pcpilot.net where we will endeavour to include it in a future issue. Also, if you want to earn revenue and prizes for your VA, why not join our affiliates scheme? For more details drop us a mail.

60th HELICOPTER SUPPORT UNIT
WEB: www.geocities.com/60thvaw/60thhsu/index.html

AFRICAN EXPRESS (AFEX)
WEB: www.afex.co.za

AFRICAN INTERNATIONAL AIRLINES
WEB: www.evalunet.com/aia/

AIR JET UK
WEB: www.flightsimnetwork.com/airjet/

AIR LINGUS
WEB: http://aer-avensis.hypermart.net/main.htm

AIR UMBRELLA
WEB: www.airumbrella.com

AIR WE GO
WEB: www.airwego.org.uk/

AIRKENT UK
WEB: www.airkentuk.co.uk/

AIRSOURCE VIRTUAL EMPLOYER
WEB: www.ar-source.com

ALASKA VIRTUAL AIRLINES
WEB: http://alaska_va.tripod.com/

ATLANTIC AEROSPACE CORPORATION
WEB: www.atlanticskies.com

BAHAMASAIR VA
WEB: http://cybermoo.net/bahamasair

BRITANNIA VIRTUAL AIRLINES
WEB: www.BritanniaVA.co.uk

BRITISH VIRTUAL AIRWAYS
WEB: www.bvair.com

BROOKS AIR VA
WEB: www.brooksair.co.uk

CALIFORNIA AIR
WEB: www.californiaAir.net

CANARY AIRLINES
WEB: http://cairlines.wigloo.com

CARGO VA
WEB: www.cargova.com

DC3 AIRWAYS
WEB: www.dc3airways.com

EASTERN VIRTUAL AIRLINES
WEB: www.evair.com/index.htm

EUROPAIR VIRTUAL AIRLINES
WEB: www.europairva.net

EUROPEAN WORLD AIRWAYS
WEB: http://ewa.ibusinessdot.com

EUROSTAR AVIATION
WEB: www.esava.net

GO-VIRTUAL
WEB: www.trudg.freeserve.co.uk

HAWAIIAN AIRLINES VA
WEB: www.gorji.com/hawaii.html

ICELAND AIR
WEB: www.allineed.is/icelandairva

JERSEY GROUP OF AIRLINES
WEB: www.jersey-va.co.uk

JMC VIRTUAL AIRLINES
WEB: www.virtualjmc.homestead.com/main.html

KNIGHT AIR
WEB: www.knightair.org

MANCHESTER AIRWAYS VA
WEB: http://manchester.atcworldstar.com

MAVERIC VA
WEB: www.mavericva.co.uk

NEW YORK CENTRAL & ADIRONDACK VA
WEB: www.flightsimmers.net/airport/nva/

NOBLE AIR
WEB: www.nobleair.com

NORTHWEST VIRTUAL AIRLINES
WEB: www.groverweb.com/nwva/

OXAIR VIRTUAL AIRLINES
WEB: www.oxair.homestead.com

PACIFIC BREEZE VA
WEB: www.pacbreezeva.com

PACIFIC WEST AIRWAYS
WEB: www.pacificwestairways.com

PARADISE WORLD AVIATION
WEB: www.pwaviation.com

POLAR AIRWAYS VIRTUAL AIRLINE
WEB: www.polarairways.com/

SOLENT AIRLINES
WEB: www.solentairlines.btinternet.co.uk

SOUTHWEST VIRTUAL
WEB: http://www.virtualswa.com

TEXAS AIR CARGO
WEB: www.geocities.com/texas_air_cargo/

TRANSVIRTUAL AIRLINES
WEB: www.transvirtualairlines.org

VIRGIN SUN
WEB: www.members.aol.com/Afre63456/vvs/

VIRTUAL 2000
WEB: www.virtualair2000.co.uk

VIRTUAL BRITISH CALEDONIAN AIRWAYS
WEB: www.avsim.com/hangar/air/vbca/index.html

VIRTUAL DELTA AIRLINES
WEB: http://virtualdelta.cjb.net/

WEST EUROPEAN AIRLINES
WEB: www.weva.homestead.com/main.html

WESTWIND VA
WEB: www.flywestwind.com

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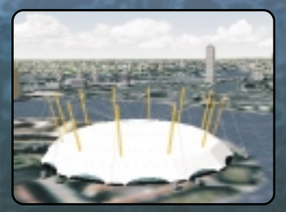

As a special bonus there are some brilliant scenery extras for you to find...

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High above the trenches, in fragile aircraft made from wood, wire and canvas, with engines that were regularly pushed far beyond their limits, fearless pioneers fought for supremacy of the skies. Now you can join them and experience the most exciting period in the history of air warfare with this stunning expansion that includes authentic World War One aircraft, scenery and 70 missions for Combat Flight Simulator 2.

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